



Common Alerting Protocol, v. 1.2 USA Integrated Public Alert and Warning System Profile Version 1.0

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Related work:

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Abstract:

This Profile of the XML-based Common Alerting Protocol (CAP) describes an interpretation of the OASIS CAP v1.2 standard necessary to meet the needs of the Integrated Public Alert and Warning System (IPAWS), a public alerting "system of systems" created by the U.S. Federal Emergency Management Agency.

Status:

This document was last revised or approved by the Emergency Management Technical Committee on the above date. The level of approval is also listed above. Check the current location noted above for possible later revisions of this document.

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1 Introduction

1.1 Purpose

In order to meet the needs of the devices intended to receive alerts from the United States Integrated Public Alert and Warning System (IPAWS) System of Systems (SoS), this CAP v1.2 IPAWS Profile constrains the CAP v1.2 standard for receipt and translation with and among IPAWS exchange partners.

The use of this Profile is not necessarily limited to the initial IPAWS Exchange Partners. It is available to all who might want to use the particular concepts defined in this specification.

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;
- Enhanced message update and cancellation features;
- Template support for framing complete and effective warning messages;
- Compatible with digital encryption and signature capability; and,
- Facility for digital images and audio.

The Common Alerting Protocol (CAP) v1.0 and v1.1 were approved as OASIS standards before the Emergency Data Exchange Language (EDXL) project was developed. However, this Profile specification shares the goal of the EDXL project to facilitate emergency information sharing and data exchange across the local, state, tribal, national and non-governmental organizations of different professions that provide emergency response and management services. Several exchange partner alerting systems of the IPAWS SoS are identified by this Profile for specific accommodation. However, the CAP v1.2-IPAWS Profile is not limited to systems. It is structured to allow inclusion of other alerting systems as deemed appropriate or necessary.

In addition to the definition of the term Profile in Section 1.2 Terminology, this Profile is responsive to the requirements articulated by the FEMA IPAWS Program Management Office as cited in Section 1.5 Non-Normative References.

35 1.2 Process

36 This Profile was developed primarily by integrating requirements related to three federal warning-delivery
37 systems:

- 38 • the broadcast Emergency Alert System (EAS) as recommended by the EAS-CAP Industry
39 Working Group;
- 40 • the NOAA Non-Weather Emergency Message (NWEM) "HazCollect" program for weather radio
41 and other delivery systems as derived from technical documentation; and,
- 42 • the Commercial Mobile Alert Service (CMAS) for cellular telephones as described in the
43 recommendations of the Commercial Mobile Service Alert Advisory Committee (CMSAAC).

44 Additional guidance was drawn from subject matter experts familiar with the design and implementation of
45 those and other public warning systems.

46 1.3 Terminology

47 The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD
48 NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described
49 in [\[RFC2119\]](#).

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

51 The term **coordinate pair** is used in this document to refer to a comma-delimited pair of decimal values
52 describing a geospatial location in degrees, unprojected, in the form "[latitude],[longitude]". Latitudes in
53 the Southern Hemisphere and longitudes in the Western Hemisphere are signed negative by means of a
54 leading dash.

55 **CMAS** – Commercial Mobile Alert System – System recommended by FCC-established Commercial
56 Mobile Service Alert Advisory Committee (CMSAAC) CMSAAC's mission was to develop
57 recommendations on technical standards and protocols to facilitate the ability of commercial mobile
58 service (CMS) providers to voluntarily transmit emergency alerts to their subscribers. The committee was
59 established pursuant to Section 603 of the Warning, Alert and Response Network Act (WARN Act), which
60 was enacted on October 13, 2006.

61 **DHS** – USA Department of Homeland Security – Federal Executive Branch Cabinet Department

62 **EAS** – USA Emergency Alert System, specifically mandated by the FCC is a national public warning
63 system that requires broadcasters, cable television systems, wireless cable systems, satellite digital audio
64 radio service (SDARS) providers and, direct broadcast satellite (DBS) service providers to provide the
65 communications capability to the President to address the American public during a National emergency.
66 The system also may be used by state and local authorities to deliver important emergency information
67 such as AMBER alerts and weather information targeted to a specific area.

68 **FCC** – USA Federal Communication Commission.

69 **FEMA** – USA Federal Emergency Management Agency

70 **HazCollect** – USA National Oceanic and Atmospheric Administration, National Weather Service All
71 Hazards Emergency Message Collection System (HazCollect) provides an automated capability to
72 streamline the creation, authentication, collection, and dissemination of non-weather emergency
73 messages in a quick and secure fashion. The HazCollect system is a comprehensive solution for the
74 centralized collection and efficient distribution of Non-Weather Emergency Messages (NWEMs) to the
75 NWS dissemination infrastructure, the Emergency Alert System (EAS), and other national systems.

76 **IPAWS** – USA Integrated Public Alert and Warning System was established by Executive Order 13407 in
77 June 2006. The Department of Homeland Security, the Federal Emergency Management Agency
78 (DHS/FEMA) and the IPAWS Program Management Office (PMO) work with public and private sectors to
79 integrate warning systems to allow the President and authorized officials to effectively address and warn
80 the public and State and local emergency operations centers via phone, cell phone, pagers, computers
81 and other personal communications devices

82 **IPAWS Exchange Partner** –The EAS, HazCollect and CMAS exchange partners are specifically
83 addressed by this specification document. Other systems may also use this Profile.
84 **Profile** – As used in this document, a Profile consists of an agreed-upon subset and interpretation of the.
85 OASIS CAP-v1.2 Specification. An XML Profile is applied to an existing XML Schema (in this case the
86 OASIS Standard CAP v1.2 Schema) in order to constrain or enforce aspects of it to accomplish a specific
87 purpose according to the definition and criteria set forth for an XML Profile. Any message that is in
88 compliance with the Profile must validate against the original XML Schema as well as the resulting XML
89 Schema of the Profile.

90
91

92 **1.4 Normative References**

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- 99 **[FIPS 180-2]** National Institute for Standards and Technology, Secure Hash Standard,
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101 [http://csrc.nist.gov/publications/fips/fips180-2/fips180-
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104 1999.
105 <http://www.w3.org/TR/REC-xml-names/>
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107 Types, IETF RFC 2046, November 1996.
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- 121 **[XMLSIG]** Eastlake, D., Reagle, J. and Solo, D. (editors), *XML-Signature Syntax and*
122 *Processing*, W3C Recommendation, February 2002.
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126 W3C Recommendation, December 2002.
127 <http://www.w3.org/TR/2002/REC-xmlenc-core-20021210/>
- 128 **[CFR Title 47 Pt 11]** Office of the Federal Register, National Archives and Records
129 Administration, Government Printing Office, *XML Code of Federal*

130 *Regulations, Federal Communications Commission, Title 47*
131 *Telecommunication Part 11 Emergency Alert System, October 1998.*
132 http://www.access.gpo.gov/nara/cfr/waisidx_98/47cfr11_98.html

133 1.5 Non-Normative References

134 **[FEMA IPAWS CAP** FEMA IPAWS Program Management Office *FEMA IPAWS CAP v1.2*
135 **PROFILE** *Profile Requirements v2.4 - Public*, December 2008
136 **REQUIREMENTS]** [http://www.oasis-](http://www.oasis-open.org/committees/download.php/31084/FEMA_IPAWS_CAP%20v1.1_Profile_Requirements_v2.4_-_Public.doc)
137 [open.org/committees/download.php/31084/FEMA_IPAWS_CAP%20v1.1](http://www.oasis-open.org/committees/download.php/31084/FEMA_IPAWS_CAP%20v1.1_Profile_Requirements_v2.4_-_Public.doc)
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148 1.6 Requirements

149 The FEMA IPAWS Program Management Office submitted the *FEMA IPAWS CAP v1.1 Profile*
150 *Requirements v2.4 – Public* document referenced above and available at the url cited above as the basis
151 for developing the CAP v1.2 IPAWS Profile v1.0. It should be noted that not all requirements found in the
152 FEMA IPAWS Program Management Office Requirements document are included in this specification.
153 For example, the proposal for multiple info blocks for different delivery system was found unnecessary.

154

2 CAP v1.2 IPAWS Profile

155

Table 1 and Table 2 together specify the REQUIRED constraints placed by the CAP v1.2 IPAWS Profile on a CAP v1.2 message in order for the message to be a valid CAP IPAWS Profile message. This table contains only those elements of CAP v1.2 for which there is a Profile Specification or Profile Note. CAP v1.2 elements not included here simply means there is no specific constraint or condition in the use of those elements for the Profile.

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Table 1: CAP v1.2 IPAWS Profile Specification and Profile Note

CAP Element	Profile Specification (Normative)	Profile Note (Non-Normative)
Elements in boldface are REQUIRED.	(Subcommittee)	(Subcommittee)
status	A value of "Actual" SHALL be used for messages intended for dissemination to the public, including test messages intended for delivery to the public.	Some exchange partners may elect not to transmit certain messages of <status> "Actual" based on the <eventCode> values of the messages. For example, CMAS may not carry EAS required weekly test messages.
source		Exchange partners should be aware that the <source> value may be publicly presented as a "signature line" in some delivery systems.
code *	(1) REQUIRED. (2) Value SHALL include the string "IPAWSv1.0" to indicate the Profile version in use.	
references	All related messages that have not yet expired MUST be referenced for "Update" and "Cancel" messages.	
info *	(1) All <info> blocks in a single alert MUST relate to a single incident or update, with the same <category> and <eventCode> values. (2) An <info> block SHOULD contain only one <eventCode> with a <valueName> of "SAME" (3) All <info> blocks SHALL be appropriate for immediate public release.	(1) Multiple <info> blocks may be used to deliver content in different languages. (2) Exchange partners may elect to process only the first <info> block encountered in a language they support. (3) Other <eventCode> elements may also be present.

161

CAP Element	Profile Specification (Normative)	Profile Note (Non-Normative)
eventCode *	(1) REQUIRED. (2) Messages intended for EAS, CMAS and HazCollect dissemination MUST include one and only one instance of this with a <valueName> of "SAME" and using a SAME-standard three-letter value. (3) Other <eventCode> elements, other than SAME, may also be present. (4) All values for EAS Event Code SHALL be passed through by EAS CAP Profile devices, even if the Event Code is not shown in FCC Part 11.31, as long as the value is a three-letter code.	
effective	Ignored if present. Alerts SHALL be effective upon issuance.	The <description> and <instruction> elements may refer to future events or actions.
onset	Ignored if present. Alerts SHALL be effective upon issuance.	The <description> and <instruction> elements may refer to future events or actions..
expires	REQUIRED.	
description	Messages SHOULD have meaningful values for the <description>.	The content in <description> may be truncated and therefore it is recommended that essential information be addressed first.
instruction	Messages SHOULD have meaningful values for the <instruction>.	The content in <instruction> may be truncated and therefore it is recommended that essential information be addressed first.
parameter *	<i>Please see Table 2 (below)</i>	
resourceDesc	(1) A value of "EAS Broadcast Content" SHALL be used to indicate that the elements of a <resource> block are intended for EAS broadcast. (2) EAS broadcast audio and video content SHOULD match the message's textual content.	(1) The value of <resourceDesc> is case sensitive. (2) The content is identified by the <mimeType>.

CAP Element	Profile Specification (Normative)	Profile Note (Non-Normative)
mimeType	A <mimeType> of "audio/x-ipaws-audio", "audio/x-ipaws-streaming-audio", "video/x-ipaws-video" and "video/x-ipaws-streaming-video" SHALL be used to identify broadcast content for delivery to the public.	(1) Selection of the most appropriate encoding is outside of the OASIS Emergency Management Technical Committee's expertise. However, OASIS recommends : A) that a single format be specified for each of these types; and, B) that preference be given to open, non-proprietary standards when selecting these encodings. (2) If broadcast content exceeds two minutes playing time it may be truncated by exchange partners except for Presidential Messages.
area *	(1) REQUIRED. (2) At least one <area> block MUST be present.	
geocode *	(1) At least one instance of <geocode> with a <valueName> of "SAME" and a value of a SAME 6-digit location (extended FIPS) SHOULD be used. (2) The more precise geospatial representations of the area, <polygon> and <circle>, SHOULD also be used whenever possible. (3) A SAME value of "000000" refers to ALL United States territory or territories.	(1) The 5-digit form, if needed, can be derived by removing the first digit from the 6 digit form. (2) If a SAME-based <geocode> is not present, IPAWS exchange partners unable to use a geospatial representation may ignore the message.

Table 2: <parameter> detail

CAP Element	Profile Specification (Normative)
parameter *	Messages intended for EAS and/or HazCollect dissemination MUST include an instance of <parameter> with a <valueName> of "EAS-ORG" with a <value> of the originator's SAME organization code.
	Messages invoking the "Gubernatorial Must-Carry" rule MUST include a <parameter> with <valueName> of "EAS-Must-Carry" and value of "TRUE" for gubernatorial alerts.
	Messages intended for CMAS dissemination MAY include an instance of <parameter> with a <valueName> of "CMAMtext" and a <value> containing free form text limited in length to 90 English characters.

167 *May have multiple occurrences in a message under CAP v1.2 specification.

168 3 Conformance

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

171 This specification references a number of other specifications. In order to comply with this specification,
172 an implementation MUST implement the portions of referenced specifications necessary to comply with
173 the required provisions of this specification. Additionally, the implementation of the portions of the
174 referenced specifications that are specifically cited in this specification MUST comply with the rules for
175 those portions as established in the referenced specification.

176

177 3.1 Conformance Targets

178 The three following conformance targets are defined in order to support the specification of conformance
179 to this standard:

- 180 a) CAP v1.2 IPAWS Profile Message
- 181 b) CAP v1.2 IPAWS Profile Message Producer
- 182 c) CAP v1.2 IPAWS Profile Message Consumer

183 A CAP v1.2 IPAWS Profile Message is an XML 1.0 document whose syntax and semantics are specified
184 in this standard.

185 A CAP v1.2 IPAWS Profile Message Producer is a software entity that produces CAP v1.2 IPAWS Profile
186 Messages.

187 A CAP v1.2 IPAWS Profile Message Consumer is a software entity that consumes CAP v1.2 IPAWS
188 Profile Messages.

189 3.2 Conformance as an CAP v1.2 IPAWS Profile Message

190 An XML 1.0 document is a conforming CAP v1.2 IPAWS Profile Message if and only if:

- 191 a) it is valid according to the schema in Section 3.4 of the specification located at [http://docs.oasis-](http://docs.oasis-open.org/emergency/cap/v1.2/)
192 [open.org/emergency/cap/v1.2/](http://docs.oasis-open.org/emergency/cap/v1.2/) and
- 193 b) the content of its elements and the values of its attributes meet all the additional mandatory
194 requirements specified in Section 2.

195

196 3.3 Conformance as an CAP v1.2 IPAWS Profile Message Producer

197 A software entity is a conforming CAP v1.2 IPAWS Profile Message Producer if and only if:

- 198 (1) it is constructed in such a way that any XML document produced by it and present in a place in
199 which a conforming CAP v1.2 IPAWS Profile Message is expected (based on contextual information)
200 is indeed a conforming CAP v1.2 IPAWS Profile Message according to this standard.

201 The condition in (1) above can be satisfied in many different ways. Here are some examples of possible
202 scenarios:

- 203 – a standard protocol (for example, EDXL-DE) transfers messages carrying CAP v1.2 IPAWS
204 Profile Messages; a client has sent a request for an CAP v1.2 IPAWS Profile Message to a server
205 which claims to be a conforming CAP v1.2 IPAWS Profile Message Producer, and has received a
206 response which is therefore expected to carry a conforming CAP v1.2 IPAWS Profile Message;
- 207 – a local test environment has been set up, and the application under test (which claims to be a
208 conforming CAP v1.2 IPAWS Profile Message Producer) has the ability to produce a CAP v1.2
209 IPAWS Profile Message and write it to a file in a directory in response to a request coming from

210 the testing tool; the testing tool has sent many requests to the application under test and is now
211 verifying all the files present in the directory, which is expected to contain only conforming CAP
212 v1.2 IPAWS Profile Messages;
213

214 **3.4 Conformance as an CAP v1.2 IPAWS Profile Message Consumer**

215 A software entity is a conforming CAP v1.2 IPAWS Profile Message Consumer if and only if:

216 (1) it is constructed in such a way that it is able to successfully validate and ingest a CAP v1.2 IPAWS
217 Profile Message, as defined in Sec 3.2

218 The condition in (1) above can be satisfied in many different ways. Here is one example of a possible
219 scenario:

220 – a client receives and processes a CAP v1.2 IPAWS Profile Message from a server which claims
221 to be a conforming CAP v1.2 IPAWS Profile Message Producer

222

223

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226 **Participants:**

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232 Gary Ham, Individual Member
233 Jacob Westfall, Individual Member
234 Thomas Ferrentino, Individual Member
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236 Sukumar Dwarkanath, SRA International
237 William Kalin, U.S. Department of Homeland Security
238 Richard Vandame, U.S. Department of Homeland Security
239 Patrick Gannon, Warning Systems, Inc.
240 Elysa Jones, Warning Systems, Inc.

241

242

B. Revision History

243

Revision	Date	Editor	Changes Made
WD.01	1-26-2009	Rex Brooks	First Draft.
WD.02	1-27-2009	Rex Brooks	Updated Table of Contents; Added Text to Section 1.1; Added Revision History
WD.03	1-29/2009	Rex Brooks	Full Subcommittee Revision of Section 1,
WD.04	2-3-2009	Rex Brooks	Multiple updates per CAP Profiles Subcommittee decisions.
WD.041	2-5-209	Rex Brooks	Multiple updates per CAP Profiles Subcommittee decisions.
WD.042	2-10-2009	Rex Brooks	Move Sections 3 to an Appendix; Insert FEMA CAPv1.1 Profile Requirements v2.4 Public as Appendix; Delete Section 4; Prepare Document for vote to submit to Emergency Management Technical Committee per CAP Profiles Subcommittee decisions.
WD.05	2-12-2009	Rex Brooks	Final prep for report out to the TC.
CD 01	2-24-2009	Rex Brooks	First Committee Draft.
PR 01	2-26-2009	Rex Brooks	First Public Review Draft.
CD02	7-7-2009	Rex Brooks	Second Committee Draft.
PR02	7-7-2009	Rex Brooks	Second Public Review Draft.

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