

Task Analysis for Composing an Alert Message (Version 0)

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Summary:

This Task Analysis focuses on the tasks involved when an authorized person composes an alert message, tasks situated between the decision to alert and the dissemination of that alert. It addresses only alert composition tasks supported by online tools and only for the issuing of alerts online in the Common Alerting Protocol (CAP) format. The analysis is intended to inform development of well-designed tools for alert composition and so to help alert composers apply their expertise efficiently and effectively.

This analysis identifies eight tasks that may be performed over one or more composing sessions to compose an alert message in CAP format. Some tasks are inherently sequential and most are optional during any one session. The eight tasks are: (1) Open Session; (2) Set-Up Session; (3) Initialize Alert; (4) Compose Alert; (5) Request Review; (6) Publish Alert; (7) View Alert Feed; (8) Close Session. During the Compose Alert task, the alert composer may perform the following sub-tasks iteratively, in no set sequence: Delineate Alerting Area; Compose Text; Set Other Cap Elements; Preview; and Validate.

Status:

This Working Draft of the *Task Analysis for Composing an Alert Message* is a technical document produced collaboratively, primarily among individuals listed in the Acknowledgments section.

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1. Scope of Alert Composition

One of the key activities in any emergency communications system is when an authorized person composes an alert message, whether for the public at large or to a restricted set of receivers. This analysis focuses specifically on alert composition and its component tasks. It does not deal with processes that feed into characterization of hazard threats, nor with processes for determining when and where to alert populations. This analysis also does not deal with communications processes that occur after the alert is issued.

Alert composition is strongly constrained by the type of communications media used for alerting and the tools available to the alert composer. This analysis addresses only the case in which alert composition is performed using networked information technology tools. In particular, it is specific to the composition of alerts in the format of the Common Alerting Protocol (CAP) standard (International Telecommunication Union Recommendation X.1303), version 1.1 [1] and version 1.2 [2]. Further, this analysis addresses only the case where the alert will be communicated via networks such as the Internet, typically as an item posted on an Internet news feed, as sent via e-mail, or as a file in CAP format sent through other means.

A distinction is made in this analysis for public alerts that are intended to be "broadcast intrusive", i.e., sent to everyone in the alerting area without regard to user opt-out choices. In the United States, such alerts are used only when the people being alerted need to act immediately or within the next hour in response to an extraordinary or significant threat that is already observed or likely to occur. [3]

2. Context of Alert Composition

When a threat is imminent on the scale of seconds, timeliness considerations may necessitate an automated alert. But, whenever time allows, the expertise of an alert composer can be crucial to the effectiveness of alerts issued by alerting authorities. A well-designed tool for alert composition can then help the alert composer to apply his/her expertise quickly and efficiently.

Although not discussed in detail here, it is important to bear in mind that alert composer expertise encompasses much more than facility with a composition tool. Organizations involved in alerting have long appreciated that alerts are only useful if they are received, understood, believed and acted upon by those at risk. To be understood, the alert message must be clear, concise, and presented within the appropriate social and cultural context. The World Meteorological Organization (WMO), among others, provides general guidance on how to improve public understanding of and response to alerts. [4] Extensive research has also been developed on specific areas of alerting expertise, such as how best to communicate the concept of uncertainty in an alerting context. [5]

Here it may be instructive to consider the following scenario discussed in a 2003 report prepared for the U.S. National Weather Service, titled "Cognitive Task Analysis of the Warning Forecaster Task". [6]

The expert has realized based on the forecasting process he/she has gone through and the data he/she has looked and compared to his/her mental model that the storm is large and destructive in nature and, in addition, moving towards a populated area. The combination of assessments sets off an alarm in the forecaster's mind. The warning needs to go out but the question arises: is the public going to recognize the intense urgency and intrinsic danger of this storm? Experts often are aware of large outside festivals or sporting events in the area that might attract a lot of people and take this into consideration. When issuing a warning they also consider the media's current focus of attention on a sporting event or cues such as no mentioning of an earlier issued

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severe weather watch. In extreme situations, experts know to consider what it might take to get the public to become aware of the severity of the event, and they choose effective means. The wording of the warning message can catch the media's attention and reach a larger number of people.

In this analysis, the focus is on aspects of alert composer expertise that can be enhanced through design features of an alert composition tool. As a practical matter today, automated tools have only rudimentary means of judging how effectively the text and coded values in an alert message will communicate to the intended audience. However, there appears to be broad consensus that tools should prompt the alert composer to incorporate "stock phrases" in emergency alert messages, which might be regarded as a kind of "risk communication". [7] At the level of an entire alert message such phrases are often part of a "template". Many alert composition tools facilitate access to best-practice templates in the appropriate language. [8] In any case, spelling and grammar checking should be provided, and some tools could also flag jargon and phrases that ought to be simplified. It might be useful as well to flag stylistic aspects (e.g., discourage passive voice; encourage imperative sentences in the "instruction" element and discourage them in the "description" element).

3. Alert Composition Tasks

Consider the following scenario. Weather radar detects a severe squall line capable of producing tornadoes. Forecasters assess the potential impact, which includes danger to life from flying debris as well as damage to property such as mobile homes, other buildings, and vehicles. The weather service decides to issue a tornado warning for a city in the tornado path. Using a tool for composing a CAP alert, the alert composer sets up the warning message with "urgency, severity, certainty" levels to activate sirens and send broadcast intrusive warnings. The alert is composed, reviewed and issued by the approving official in little more than a minute, giving people time to protect lives and property.

To compose an alert message in CAP format, the alert composer uses a tool to perform a series of tasks over one or more composing sessions. Although not typical, a composing session may involve multiple alerts. In any one session, the following tasks are performed in sequence, although not all tasks are performed in each session. For instance, a particular approving official session may consist of only the tasks "Open Session", "Set-Up Session", "Publish Alert", and "Close Session".

Task 1 - Open Session

The alert composer provides appropriate credentials (password, fingerprint, etc) for his/her role in the alerting process. The tool can be used by any authenticated alert composer, but only those authenticated as approving officials can publish the alert.

Next Tasks: 2 (Set-Up Session) or 8 (Close Session)

Task 2 - Set-Up Session

The alert composer chooses the session type according to several aspects affecting how he/she performs the tasks:

- (1) Is the time available for alert composition more than one minute? If not, then a drastic simplification method must be used.
- (2) In what language is the Internet feed where this alert will be published? The composition of this particular version of the alert should be in that language.
- (3) Will Internet be available during the alert composition session? If not, then workarounds are necessary for any tool functions that require Internet.

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(4) Will the alert be published as an actual alert or will it be published as a test or an exercise alert? Such sessions must be clearly distinguished.

(5) Will the alert be published as a public alert or published as a private or restricted alert? Such sessions must be clearly distinguished.

(6) Should this alert update or cancel a currently issued alert? The alert composer must consider updating or canceling alerts already issued rather than issuing a new alert.

Next Tasks: 3 (Initialize Alert), 5 (Request Review), 6 (Publish Alert) or 8 (Close Session)

Task 3 - Initialize Alert

The alert composer may be updating or canceling an existing alert, initiating a new alert, revising a draft alert, or reviewing a draft alert as an approving official. The alert composer selects an existing draft CAP alert, published CAP alert, or generic CAP alert template to use as the base for this session. This selection requires that the composer knows some details about the type of event and whether this session is at the beginning, middle, or end of the drafting and publishing workflow.

Next Tasks: 4 (Compose Alert), 5 (Request Review), 6 (Publish Alert) or 8 (Close Session)

Task 4 - Compose Alert

During this task, the alert composer may perform the following sub-tasks iteratively, in no set sequence:

Task 4a - Delineate Alerting Area(s) - The alert composer identifies the area to be alerted. At minimum, this requires use of an interactive map tool to delineate one or more circles or polygons. The alert composer may also enter free text and/or select from place names, and in some cases geocodes for the particular area(s).

Task 4b - Compose Text - The alert composer identifies the type of event and composes text for headline, description, and instruction elements. Vetted text suggestions are strongly recommended so that the alert composer could cut-and-paste such text. This is particularly important for the instruction text because people being alerted need to be clear on what to do.

Task 4c - Set Other Cap Elements - The alert composer may need to set other CAP elements, using coded values, free text, and specialized lists that may be specified in local policies. These should be included in templates or otherwise customized to the degree feasible.

Task 4d - Preview - The alert composer occasionally previews how the draft alert will appear to a target audience, using Google Public Alerts [9] for instance. Doing so should also show this new alert in context with other active alerts nearby this alerting area. If the alert meets broadcast intrusive criteria, explicit confirmation of that intent should be required of the alert composer.

Task 4e - Validate - Optionally at any point, and mandatory just before release, the alert composer validates the draft alert against the CAP standard and any applicable profiles, using the Google CAP validator [10] for instance.

Next Tasks: 5 (Request Review), 6 (Publish Alert) or 8 (Close Session)

Task 5 - Request Review

Before requesting review of the draft CAP alert, the alert must have been validated against the CAP standard and any applicable profiles (e.g., using the Google CAP validator). The alert composer may then request review of the draft alert, perhaps via e-mail with a bcc (blind courtesy copy) to the e-mail address of the alert composer.

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Next Tasks: 8 (Close Session) or 2 (Set-Up Session)

Task 6 - Publish Alert (Approving Official Only)

Before publishing the approved CAP alert, the approving official must validate the draft alert against the CAP standard and any applicable profiles (e.g., using the Google CAP validator). If the alert meets broadcast intrusive criteria, the approving official should make an explicit confirmation of that intent.

Next Tasks: 7 (View Alert Feed), 8 (Close Session) or 2 (Set-Up Session)

Task 7 - View Alert Feed

After an approved CAP alert has been published, an alert composer or approving official should view the updated alert feed or other dissemination product/service to assure the alert was posted as intended so that it can be disseminated appropriately.

Next Tasks: 8 (Close Session) or 2 (Set-Up Session)

Task 8 - Close Session

Either intentionally by the alert composer or approving official, or due to other circumstances, an alert composing session may be terminated at any time. To the degree feasible, work in progress should be secured and usable in subsequent sessions.

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|------------------|---|
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Glossary of Terms

broadcast intrusive - public alert messages that are intended to be sent to everyone in the alerting area without regard to user opt-out choices

CAP (Common Alerting Protocol) - a format for exchanging warnings and emergency information among alerting technologies based on eXtensible Markup Language (XML) rules for encoding documents so that they are both human-readable and machine-readable

Task Analysis - analysis of how a task is accomplished, may include descriptions of manual and mental activities, task and element durations, task frequency, task allocation, task complexity, environmental conditions, necessary clothing and equipment, and other unique factors involved in or required for one or more people to perform a given task [11]

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Revision History

| Draft | Date | Editor | Major Changes Made |
|-------|-------------------|-----------------|---|
| v0-01 | 10 September 2014 | Eliot Christian | Version 0, initial Working Draft (01) |
| v0-02 | 22 September 2014 | Eliot Christian | Expanded text for update, cancel, and broadcast intrusive alerts |
| v0-03 | 2 October 2014 | Eliot Christian | Added tornado scenario to illustrate alert composer process; Added link to some text templates for common alerting situations in five languages |

End Notes

[1] Jones E, Botterell A (editors). Common Alerting Protocol Version 1.1. Technical Standard. Burlington, MA, USA; OASIS, Emergency Management Technical Committee; 2005. CAP-V.1.1. Available from: URL: https://www.oasis-open.org/committees/download.php/15135/emergency-CAPv1.1-Corrected_DOM.pdf.

[2] Westfall J (editor). Common Alerting Protocol Version 1.2. Technical Standard. Burlington, MA, USA; OASIS, Emergency Management Technical Committee; 2010. CAP-V.1.2. Available from: URL: <http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.pdf>.

[3] The U.S. Federal criteria for broadcast intrusive, also called "Imminent Threat Alert", is in the United States Code of Federal Regulations (CFR), 47 CFR 10.400, available at <http://www.law.cornell.edu/cfr/text/47/10.400>.

[4] Davidson J, Alex C. Guide on Improving Public Understanding of and Response to Warnings (PWS-8). Technical Document. Geneva, Switzerland; World Meteorological Organization, Public Weather Services; 2002. WMO/TD No. 1139. Available from: URL: <http://www.wmo.int/pages/prog/amp/pwsp/pdf/TD-1139.pdf>.

[5] Gill J. Guidelines on Communicating Forecast Uncertainty (PWS-18). Technical Document. Geneva, Switzerland; World Meteorological Organization, Public Weather Services; 2008. WMO/TD No. 1422. Available from: URL: http://www.wmo.int/pages/prog/amp/pwsp/documents/GuidelinesonCommunicatingUncertainty_TD-4122.pdf.

[6] Jahn B, Rall E, Klinger D. Cognitive Task Analysis of the Warning Forecaster Task. Final Report. Norman, OK, USA: National Weather Service, Office of Climate, Water, and Weather Services; 2003 Jan. Order Number RA1330-02-SE-0280. Available from: URL: <http://129.15.111.20/modules/CTA/Final123102rev030108.pdf>.

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[7] Janoske M, Brooke L, Sheppard B. Understanding Risk Communication Best Practices: A Guide for Emergency Managers and Communicators. Final Report. College Park, MD, USA. U.S. Department of Homeland Security, Science and Technology Directorate, Human Factors/Behavioral Sciences Division. 2012. Available from: URL: <http://www.start.umd.edu/start/publications/UnderstandingRiskCommunicationBestPractices.pdf>.

[8] A set of templates for 20 common emergency alert situations was developed as part of a Regional Risk Reduction Initiative conducted in the Caribbean under the United Nations Development Program. Those templates, in Dutch, English, French, Spanish, and Papiamentu, are feely available from: URL: <https://docs.google.com/file/d/0B5FiAsI5yGbZUHZkWNtE1Y2I5aTg/>.

[9] Google Public Alerts is described at http://google.org/intl/en_US/crisisresponse/publicalerts/. Current alerts are displayed in Google Maps at <http://google.org/publicalerts> .

[10] The Google CAP Validator is available at <https://cap-validator.appspot.com/>.

[11] Kirwan, B. and Ainsworth, L. (editors) (1992). A guide to task analysis. Taylor and Francis.