

Environment Canada and the Common Alerting Protocol (CAP) (Information Sheet)

2 - Update, Cancel and Expires - Environment Canada use of CAP Message Types

Title:	Environment Canada and the Common Alerting Protocol (CAP) <i>2 – Update, Cancel and Expires - Environment Canada use of CAP Message Types</i>
Description:	A discussion about the use of the <msgType> values Update and Cancel and how they are combined with the <expires> element in the Environment Canada implementation of the Common Alerting Protocol (CAP) using the Canadian Profile
Date:	March 1, 2013
Version:	2.0
Replaces:	1.0
Reference:	Refer additionally to the following information sheets: <i>1 - General Overview</i>

Purpose of this Document

This Information Sheet provides background on:

- The *warning* message intended for the final audience and the use of multiple <info> blocks for that purpose
- The CAP-XML alert message intended for the last mile distributor and the use of the CAP <msgType> element for that purpose
- How Environment Canada marks the expires time for an audience message within the CAP alert message
- How Environment Canada has chosen to use the CAP element <msgType> in our CAP alert messages and message updates

The reader should be familiar with information sheet *1 - General Overview* prior to reading the discussion contained within this document.

The Audience message in an Environment Canada Alert

In the Environment Canada *warning* business model, we issue and update our *warnings* frequently with new messages. Within each message, we convey the information that we want our intended audience to know going forward. However, considering that our audience is predominantly the general public, a single message may not have the same relevance for differing segments of our audience.

It is for that reason that we have come to using the practice of customizing several different audience messages for each *warning* message - one for each of the recognized audience segments that we have defined. Based on a number of distinguishing factors, each audience segment is then served by their targeted audience message.

The factors that go into defining the segments of the general public Environment Canada wants to serve include:

- the audience themselves - the Canadian public operates in both official languages – French and English
- the subject hazard of the warning, and any recommended actions as a result of those hazards - whether those hazards are occurring, forecasted to occur; or have recently ended
- the time and place and degree of the hazard - for individuals to ascertain relevancy based on their own particular situation

The official languages factor is resolved behind the scenes from the forecaster by translating the forecaster's working language output into the other official language. The other two factors listed above are directly applicable to the duties of the forecaster while monitoring the hazardous situation as it unfolds.

In a typical example of an Environment Canada *warning* message, one with references to locations with an active hazardous threat and locations where the hazard is over, four <info> blocks would appear in our CAP messages - two in English and two in French; and from a different point of view, two with active *warning* locations and two with ended *warning* locations¹.

¹ Environment Canada considers it good practice to have an end client message telling people the threat is over rather than just having a message for an active threat just disappear off the display when the threat is over.

The Process of Updating *Warning* information

As discussed in information sheet 1 – *General Overview*, an Environment Canada *warning* is alive – a data object periodically updated to the current state with new information. At marked moments in time, these updates include new information on the characteristics of the hazardous event, and any new details on the *warning* itself. The Environment Canada forecaster does this by registering a new all-encompassing forecaster message into our data management system. This action then triggers the generation of several new alerting products, containing one or more audience messages, which are then distributed by Environment Canada through various dissemination conduits.

It is important to note that the latest forecaster message that is put into the system is not always considered to be a full accounting of all the valid *warning* information. In a few cases, the latest forecaster message only partially updates the system. However, a history of all Environment Canada forecaster messages is kept, such that we are able to consolidate all the valid *warning* information in one place. This in turn allows us to assemble a full accounting of the alert when we do create our audience messages – even if some of that valid information originally came from an older forecaster message.

Distributing Audience Messages in CAP

Distributing audience messages has more to do with the dissemination conduit than the messages themselves. Depending on how the audience messages are to be disseminated, a variety of customized alerting products are constructed to further that effort. CAP is one such product of many that we employ to get the message out.

In the CAP product, putting all of the audience messages from the same alert, from the same marked moment in time, is the preferred practice. The concept of the CAP `<info>` block, and the ability to have multiple `<info>` blocks in a single CAP message, is ideally suited for accommodating the Environment Canada practice of multiple audience messages.

Since the CAP model is all about messages, and the latest message in a series is all that matters, the full accounting of the valid alert information is included in each Environment Canada CAP message. Furthermore, within each CAP message, all the relevant and valid audience messages are included with each given to a separate `<info>` block.

The CAP message is then delivered to last mile distributors who in turn know that the latest CAP message, by definition, supersedes any previous CAP message that is referenced. So unlike Environment Canada, where we need to consolidate the

latest forecaster message into the whole, the last mile distributors need only to focus on the newest CAP message. The last mile distributor, per their business model, has all the information needed to replace the suite of previous audience messages with new audience messages.

Environment Canada recognizes that confusion may arise if an audience receives a message not intended for them, or receives two or more conflicting audience messages. For this reason, all the audience messages are qualified with additional metadata that helps the last mile distributor distinguish where and when the audience message should be presented. This is basic information required in a CAP-CP message. How to process and interpret this information is discussed in the sections below.

Processing a CAP Message

CAP defines five different values for the <msgType> element that can be found in CAP messages. Upon receipt of a new CAP message, a last mile distributor can act accordingly for three of those values when there is an audience message to display²:

- **Alert:** present the one or more audience messages to its clients. The alert now exists and the audience message will remain in effect until it expires or is superseded by a new message
- **Update:** stop presenting the previous one or more audience message(s) and start presenting the new one or more audience message(s)³. The new information within the CAP message supersedes the previous information (thus invalidating the previous information). The identifiers for the previous CAP message(s) are determined by interrogating the identifiers listed in the <references> element. The <references> values act as a point of continuity between a series of CAP messages for the same alert.
- **Cancel:** stop presenting the previous one or more audience message(s) and start presenting the new one or more optional audience message(s) (if present). The new information within the CAP message supersedes the previous information (thus invalidating the previous information). According

² Two additional values, “**Ack**” and “**Error**”, are defined for <msgType> and used in two-way communications. As Environment Canada is an issuer with one-way communications (outbound) there is presently no need in EC CAP for usage of these two other values and no further discussion referencing them is in this document.

³ It is possible for a series of messages to actually include only one message in the series. It is a decision on the part of the issuing authority whether or not follow-up messages will be sent. In practice, Environment Canada’s alerting model does include a few cases where alerts do not have follow-up messages, but those are due to procedural error rather than by policy. Such messages then would self-expire at the indicated time.

to the CAP standard, the alert is immediately cancelled, even if an optional <info> block is present with an audience message that may still be in effect for a period of time.

In the case of Environment Canada CAP messages, a last mile distributor is only expected to process the CAP message based on two of the <msgType> values as follows:

- **Alert:** present the one or more Environment Canada audience messages to its clients
- **Update:** stop presenting the previous one or more Environment Canada audience message(s) and start presenting the new one or more audience message(s)

Environment Canada deliberately does not make use of the <msgType> value option of “Cancel”. It’s not that we don’t end our Alerts - it’s just that we do so using a different, and preferred, mechanism within the CAP standard – that being “Update” with an expires time. Technically, a “Cancel” in CAP means to revoke the previous message implying that the previous message was sent in error.

Understanding Cancel Messages

For the general public, having the latest audience message for their location of interest is all that is necessary. The latest message is all that matters until it is no longer in effect. If that latest audience message however is the one that informs that the hazard is over, then that latest message would not normally be expected to have an update.

Unfortunately, with several weather scenarios, this isn’t always true. Occasionally, the latest audience message informing on the “it’s over” state of the hazard, may have to be superseded with a new message before the old message expires. It’s possible that a new hazardous event, producing the same type of hazard as before, re-develops in the same referenced location, causing a new warn-able threat. We are noting here that the consequences of such a scenario are problematic with the CAP <msgType> of “Cancel”.

Firstly, with “Cancel”, there is the option to just cancel the Alert without generating an “it’s over” audience message. Online CAP examples often tend to show this use of “Cancel” - so much so that some last mile distributors don’t even look for the “it’s over” audience message in such cases.

Secondly, even if they did look for and present an “it’s over” audience message, it would not likely be able to be superseded in situations where it would be desirable to do so.

Environment Canada does not want an “it’s over” audience message playing concurrently with a “here’s a new threat” audience message as we believe it would be confusing to the general public. To stop this from ever happening, we simply avoid using the <msgType> of “Cancel” and instead use the <msgType> of “Update” combined with another CAP element that helps us alleviate this issue. That CAP element is <expires>.

Expiring audience messages with the use of the <expires> element

Within CAP, there is an optional element called <expires> which can be used to preset an expiry time for an <info> block, and hence an audience message. By setting the <expires> element within an <info> block, one would not have to explicitly “Update” or “Cancel” a CAP message with a new message to formally expire an audience message. Based on the alerting business model of the issuing authority, an authority could choose to never “Update” or “Cancel” an alert message and still have the information always expire properly – it would just happen at a pre-determined time.

However, the presence of the <expires> element in CAP also allows issuing authorities greater flexibility in how they might match their alerting business to a CAP enabled system. The options include:

- **Never** using the <expires> element and **always** issuing a “Cancel” message as the last message
- **Always** using the <expires> element and **never** issuing an “Update” or “Cancel” message
- Using the <expires> element **and** using the “Update” or “Cancel” message

The best choice is often determined by analyzing the business model of the issuing authority⁴. Environment Canada always uses the <expires> element and uses the “Update” message frequently in a way that fits our alerting model.

⁴ Theoretically, a fourth option of never using <expires> and never issuing an “Update” or “Cancel” also exists but we believe this to be a poor practice as it creates a problem for last mile distributors. Even though this practice is not invalid, last mile distributors would want some advice on how to deal with such a scenario and would have to be actively involved in the decision of “how long is too long?” to keep a stale alert message active. Many last mile distributors do not want that responsibility citing liability issues.

Expires time and subsequent CAP alert messages

When employing a combination of the two (both <expires> and subsequent CAP messages), we need to be clear on how they work together.

If the <expires> element is present within an <info> block, it has attributed that block of information with a time to expire. However, if a subsequent “Update” or “Cancel” message is issued, the new message supersedes the previous message thus invalidating the previous message. Any previous <info> blocks, including any previous <expires> value, are no longer valid. Any new <expires> value(s) reported in the new CAP message applies to the new information in the new message.

Furthermore, if the new CAP message has a <msgType> value of “Update” and has a new <expires> time that is farther into the future, the life of the alert can now be considered to be extended to this new later time.

And while this is technically true, it really has no bearing on a last mile distributor task of just presenting the new audience message contained in the latest message. A series of “Update” and new <expires> times could conceivably extend an alert forever⁵.

Alternatively, if an issuer chooses to not enter an optional <expires> time they would be expected to issue an “Update” or “Cancel” to expire past messages. Environment Canada doesn’t employ either model and many last mile distributors are reluctant to use CAP alert messages using such models as it may put them in an awkward position of making alert messaging decisions they may not want to.

Environment Canada use of Expires and Multiple Info Blocks

CAP has defined many elements, including <expires>, to be applicable to blocks of information, not to the entire CAP alert message. When Environment Canada began using CAP, we immediately began using multiple <info> blocks with each <info> block having a different <expires> time⁶. The “it’s over” <info> block has a

⁵ It would then be incumbent upon Environment Canada as an issuing authority to make sure any “update” CAP alert message is issued prior to the currently active information expiring otherwise gaps in the presentation of information could occur. We recognize this to be a choice of practices but for us it would be a poor one to have gaps in the presentation of messages, as we believe it creates confusion from the audience point of view. Other issuers may find that gaps are not necessarily undesirable.

⁶ Whether or not an issuing authority employs multiple <info> blocks is a decision by a business of what practices to employ. One such practice would be to just include active areas in a CAP message and ignore the recently ended areas. If the updated CAP alert message is used to create a display and that display is not lighting up an area that was lit up previously, all is fine, right? Well unfortunately, that is a narrow point of view. And while yes, certain dissemination mediums may be able to function with just this active area information (i.e.

considerably shorter <expires> time than the active <info> block. In other words, we'd prefer the last mile distributor to tell the audience in the "it's over" location that the alert is over, but to do so using much shorter message duration than the duration for active location messages.

In these separate <info> blocks, locations that are now free of the hazard would not only be associated to a different <expires> time, but the audience message contained within the block would convey the threat being over. The information intended for the clients in the active locations would still contain information about the threat ongoing. We note that other <info> block CAP elements like <urgency>, <severity>, <certainty> and <responseType> would also have differing values across these <info> blocks which could be used to trigger the appropriate presentation characteristics for the last mile distributor based on their presentation model.

With the relevant information and associated locations noted in separate <info> blocks, the message can now be disseminated in a variety of ways. For one-time dissemination conduits like text messaging, a one-time text message can be sent saying "it's active" or "it's over" for every CAP message location that applies; however for continuous display dissemination conduits like a web site, a variety of choices on what is the best display option is available. Should the "it's over" message be presented? When should the "it's over" message <expire>? Should the lack of a message imply "it's over"? Regardless of preference, the information is there to be used or dismissed as the distributor, community, or end user sees fit. If that decision is to be deferred back onto the issuer, then for Environment Canada the decision is to display the "it's over" message, and the <expires> time is there to indicate how long to display it.

Normally, Environment Canada sets the expiry time to one hour for audience messages in locations where the hazard no longer poses a threat, however, it is not necessarily set to that permanently. Policy on such practices can change. Our experience has told us that a last mile distributor generally does not prefer to make expiry time decisions so we do. By establishing the practice of providing last mile distributors with an <expires> time within our CAP message <info> blocks, last mile distributors can choose to report the "it's active" and/or the "it's over" information knowing that a preference has been indicated in each block of information.

a web page display), other dissemination systems either cannot or would prefer not. Our own preference is to inform on the "it's over" state and so we do. Environment Canada recognizes this to be a choice of practices.

The non-use of “Cancel” in Environment Canada Alerts

Environment Canada issues, and subsequently ends, almost all of our *warnings*. We often update them several times before ending them. In those updates, we often reference newly inactive areas, when they occur, as well as the active areas, when they occur, and use multiple <info> blocks to distinguish between the two. Therefore, ended locations, and associated “it’s over” audience messages, appear in Environment Canada “Update” CAP alert messages all the time. The <info> blocks in these “Update” messages convey the “it’s over” information along with an <expires> time allowing for the “it’s over” message to play for a shorter pre-defined period of time.

Consequently, when the final message in a series of *warning* messages is issued, thus ending all the remaining locations referenced in the alert, Environment Canada will employ the same CAP “Update” strategy for consistency of practice. The resulting <info> block will look the same as any other “it’s over” <info> block that one may find in any other “Update” message. Since we use an <expires> time in all cases to set an expiry for the “it’s over” audience message, it doesn’t matter if “Update” or “Cancel” is used. So by decision, “Update” is always used for consistency as it works for our needs with <expires>, and we can avoid the problems we perceive with “Cancel”.

How does an Environment Canada Alert formally end?

By business policy, Environment Canada is supposed to end all our alerts explicitly⁷. If an alert is not formally ended, it will just fall off the system after a default period of time has passed. In either case, once an alert is no longer active in our in-house system, we can’t update that same alert. Any new threat, even if it is for the same type of event and for the same place, would have to be addressed in a brand new alert.

If an Environment Canada alert is not updated or ended explicitly it will go through a series of states. First, it will fall into a state considered as active. Second, if it is not superseded, it will fall into a state considered as stale. After being stale for a period of time it will eventually fall off the system. During the stale state, the audience message is still active but the information is considered out of date and is in need of an update. Rather than expire the audience message when the alert goes stale, we expire the audience message at the later time when the alert falls off the system. By policy, this strategy is preferred as it lessens the chance for gaps in the presentation of audience messages and allows for an alert to be updated even in the rare case of one going stale.

⁷ In the past, all our special weather statements were never ended (i.e. were just considered one time declarations) however presently, by policy, all of them are formally ended.

In Environment Canada CAP alert messages, the <expires> time given to active <info> blocks is equivalent to that point where the alert would stop being stale and fall off the system. Internally however, we expect our forecasters to update or end our alerts before the information even gets stale. This means that within a single Environment Canada CAP message, when all the <expires> times for all the <info> blocks have been reached, and without a new message to supersede the message, the alert can be considered formally ended⁸. Internally, a new alert would be required to issue additional information and thus a new CAP Alert would also be issued.

⁸ In CAP, this ended state of an alert is not assumed to exist just because all the information in a CAP message has expired - far from it. The <expires> time only applies to blocks of information and the associate audience message. An issuing authority could still issue an Update after this time and still call it an update. However, there is nothing wrong with issuing authorities making a declaration that the cancelled state has effectively occurred in this situation since the the audience experience will be the same in either case; whether we start another alert or not, to the audience it is just another message. Environment Canada recognizes that this is just a business policy declaration and has nothing to do with CAP. This declaration only applies to us and not necessarily any other issuing authority.