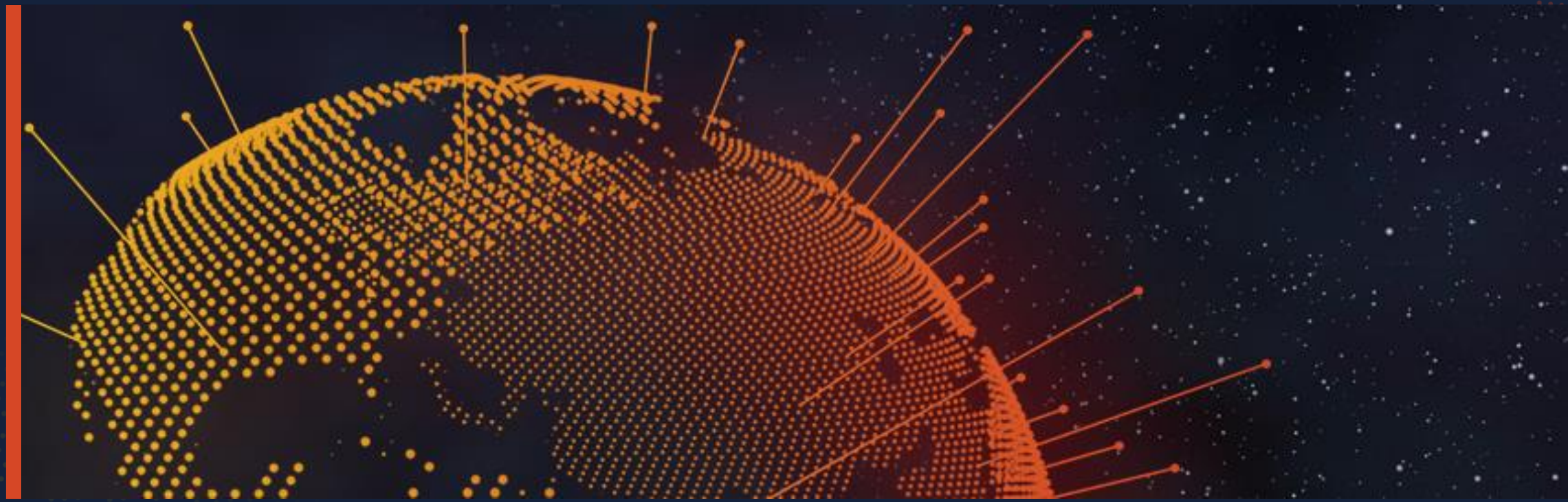
EARTH NETWORKS



LIGHTNING ALERTS DATA FEED

USER MANUAL

EN.PM.UM22 3/23/2017

TABLE OF CONTENTS

OVERVIEW

Dangerous Thunderstorm Alerts (DTAs) by Earth Networks provide advanced notification of the increased threat of severe weather moving into an identified area. A DTA alert is issued when there is a high frequency of lightning detected by the Earth Networks Total Lightning Network™ (ENTLN) indicating the increased potential for: Lightning strikes, Heavy rain rates, High winds, Hail and Tornadic activity.

The alert is updated every 15 minutes until the dangerous weather activity is no longer a threat and the alert expires. The advanced technology used within ENTLN enables the detection of both in-cloud and cloud-to-ground lightning (otherwise known as total lightning). High rates of total lightning activity serve as precursory indicators of the potential for severe weather activity.

Earth Networks issues a Dangerous Thunderstorm Alert when the lightning detection rate exceeds high levels. These alerts are available through a data API that will return the alert information in CAP format. The alert CAP feed includes a polygon encompassing the area at risk, direction and speed of the severe lightning activity, cities in the route of the storm and current observations from weather stations near or in the affected area. A ready to use weather bulletin text is also provided within the CAP feed.

ENTLN tracks three lightning intensity rates. The DTA is the highest rate and the only event considered an alert for severe weather. The other two thresholds – titled “level 1” and “level 2” can also be delivered through the feed but are not considered alerts. The thresholds are:

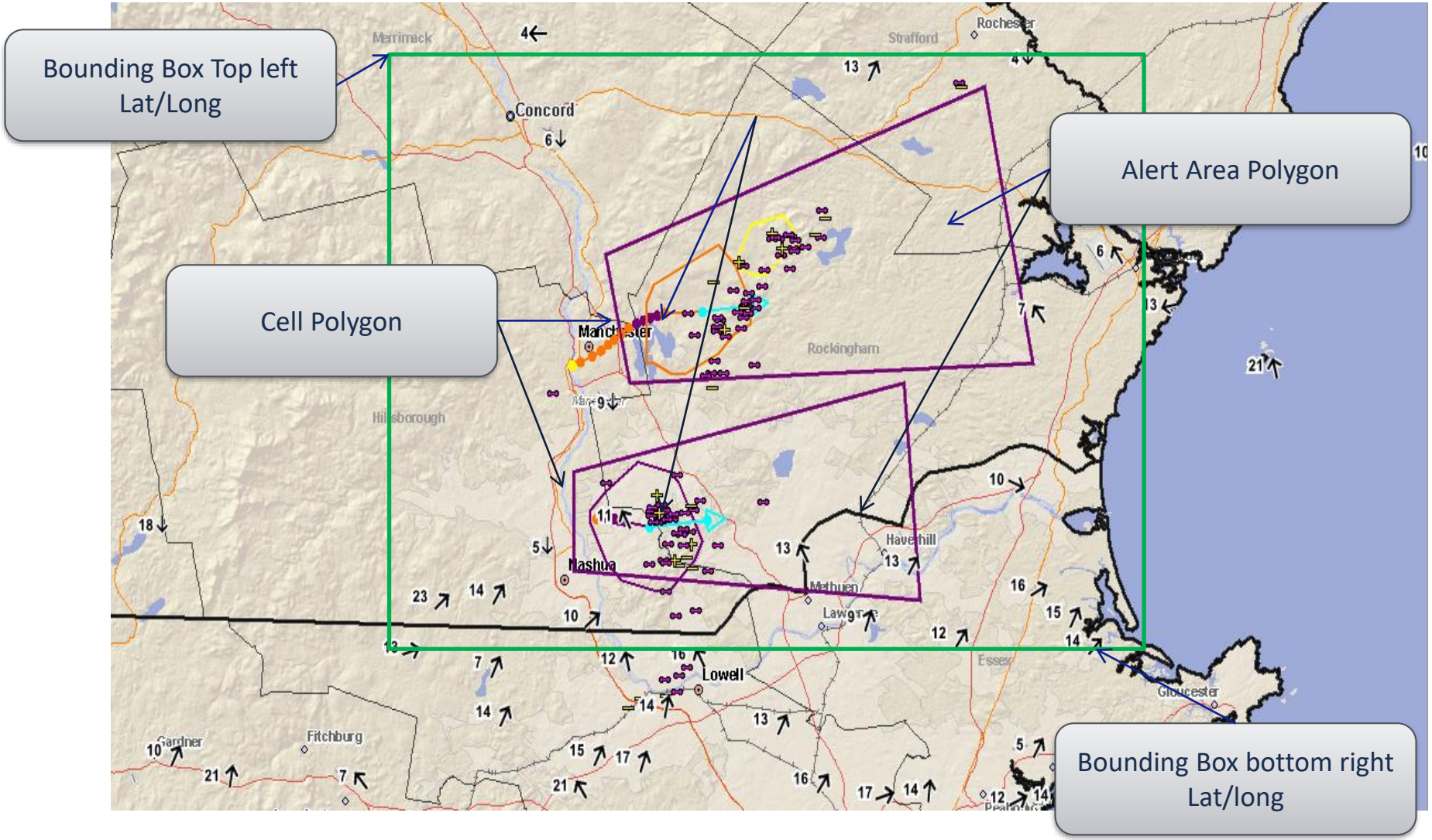
Level 1: 3+ Flashes/min

Level 2: 12+ Flashes/min

Level 3 (DTA): 25+ Flashes/min

ENTLN will produce DTAs only in areas of the world where the network have enough lightning sensors to deliver a high detection rate of lightning. As the network is constantly growing and new sensors are added monthly the area covered by DTAs is growing as well.

OVERVIEW - DTA GEO ELEMENTS



EARTH NETWORKS

THE API CALL

The call to the Lightning Alert service:

http://api.lxalerts.earthnetworks.com/CellAlerts.aspx?nwlat=12.3000&nwlon=-78.0000&selat=-59.6000&selon=-33.2000&level=1,2,3&format=CAP&partnerid=xxxxxxx

Parameter	Description
nwlat	The latitude of the top left corner of the boundary box. Up to 5 decimal placements.
nwlon	The longitude of the top left corner of the boundary box. Up to 5 decimal placements.
selat	The latitude of the bottom right corner of the polygon in decimals. Up to 5 decimal placements.
selon	The longitude of the bottom right corner of the polygon in decimals. Up to 5 decimal placements.
level	Instruct the service to deliver DTAs (3), level 2 or level 1 notifications that intersect with the defined boundary box.
Format	Specify the format the feed should be delivered in. CAP is the only supported format at the moment.
Partner ID	The code you will receive from Earth Networks. Partner ID must be added to the HTTP request.

EN ALERT CAP FILE STRUCTURE


```
<?xml version="1.0" encoding="utf-8" ?>
- <ArrayOfAlert xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  + <alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  </ArrayOfAlert>
```


Element	Description
ArrayOfAlert	ArrayOfAlert is NOT a CAP element. The official CAP schema describes the elements within a single alert file. EN delivers multiple alerts within the same file. Based on the request these alerts may include DTAs as well as Level1 and Level 2 notifications. Each Alert element is fully compliant with the standard CAP schema – as published here: http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html
alert	The “alert” element contains all the information on a single DTA or Level1/Level2 notifications. Note that CAP feed does not distinguish between the DTA alert and the Level1 or Level2 notifications. All are “alert” elements. The DTA alert element contains more information and has a “Severe” value in the Severity element.

EARTH NETWORKS

THE ALERT SUB-ELEMENTS

```
<alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  <identifier>SA146</identifier>
  <sender>cap-alert-feed@earthnetworks.com</sender>
  <sent>2011-12-16T02:25:00+00:00</sent>
  <status>Actual</status>
  <msgType>Alert</msgType>
  <source>Earth Networks</source>
  <scope>Public</scope>
```

Elements	Description
Identifier	A number or string uniquely identifying this message, assigned by the sender.
Sender	Identifies the originator of this alert. Guaranteed by assigner to be unique globally; e.g., may be based on an Internet domain name.
sent	The date and time the alert originator sent the alert. The date and time represented in the DateTime Data Type format (e.g., "2002-05-24T16:49:00-07:00" for 24 May 2002 at 16:49 PDT).
status	The code denoting the appropriate handling of the alert message “Actual” - Actionable by all targeted recipients “Exercise” - Actionable only by designated exercise participants “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

EARTH NETWORKS

THE ALERT SUB-ELEMENTS - CONTINUED

```
<alert xmlns="urn:oasis:names:tc:emergency:cap:1.2">
  <identifier>SA146</identifier>
  <sender>cap-alert-feed@earthnetworks.com</sender>
  <sent>2011-12-16T02:25:00+00:00</sent>
  <status>Actual</status>
  <msgType>Alert</msgType>
  <source>Earth Networks</source>
  <scope>Public</scope>
```

Elements	Description
msgType	The code denoting the nature of the alert message; “Alert” - Initial information requiring attention by targeted recipients
source	The text identifying the source of the alert message: Earth Networks
scope	The code denoting the intended distribution of the alert message: “Public” - For general dissemination to unrestricted audiences “Restricted” - For dissemination only to users with a known operational requirement “Private” - For dissemination only to specified addresses

EARTH NETWORKS

INFO ELEMENT AND SUB-ELEMENTS

```
- <info>
    <category>Met</category>
    <event>Earth Networks Dangerous Thunderstorm Alert</event>
    <responseType>Execute</responseType>
    <urgency>Expected</urgency>
    <severity>Severe</severity>
    <certainty>Likely</certainty>
    <effective>2011-12-06T11:05:18+00:00</effective>
    <expires>2084-01-01T00:00:00+00:00</expires>
    <senderName>Earth Networks Headquarters, Germantown, MD</senderName>
    <headline>Earth Networks Level Lightning Polygon until 2084-01-01T00:00:00.0000000+00:00</headline>
```

Elements	Description
category	The code denoting the category of the subject event of the alert message. Met is the code for weather.
event	The text denoting the type of the subject event of the alert message.
responseType	The code denoting the type of action recommended for the target audience. The DTA code will always be: Execute" - Execute a pre-planned activity. (See description element for a possible pre-planned activity.
urgency	The code denoting the urgency of the subject event of the alert message. The code will always be "expected": Responsive action SHOULD be taken soon (within next hour)
severity	The code denoting the severity of the subject event of the alert message . "Severe" – DTA "Moderate" – Level 2 threshold "Low" – Level 1 threshold

EARTH NETWORKS

INFO ELEMENT AND SUB-ELEMENTS - CONTINUED

```
- <info>
    <category>Met</category>
    <event>Earth Networks Dangerous Thunderstorm Alert</event>
    <responseType>Execute</responseType>
    <urgency>Expected</urgency>
    <severity>Severe</severity>
    <certainty>Likely</certainty>
    <effective>2011-12-06T11:05:18+00:00</effective>
    <expires>2084-01-01T00:00:00+00:00</expires>
    <senderName>Earth Networks Headquarters, Germantown, MD</senderName>
    <headline>Earth Networks Level Lightning Polygon until 2084-01-01T00:00:00.0000000+00:00</headline>
```

Elements	Description
Info	The container for all component parts of the info sub-element of the alert message
Certainty	The code denoting the certainty of the subject event of the alert message. The code will always be: “Likely” - meaning that the possibility of occurrence is greater than 50%
effective	The alert event start time. The date and time will be represented in the DateTime Data Type format (e.g., “2002-05-24T16:49:00-07:00” for 24 May 2002 at 16: 49 PDT).
expires	The alert event expected end time. The date and time will be represented in the DateTime Data Type format (e.g., “2002-05-24T16:49:00-07:00” for 24 May 2002 at 16: 49 PDT).
senderName	The human-readable name of the agency or authority issuing this alert.
headline	A brief human-readable headline for the alert message.

INFO ELEMENT AND SUB-ELEMENTS - CONTINUED

<description>
An Earth Networks Dangerous Thunderstorm Alert is in effect until 4/29/2020 12:10 PM -04 Event Start: 4/29/2020 11:25 AM -04 Event End: 4/29/2020 12:10 PM -04 Earth Networks Dangerous Thunderstorm Alert Earth Networks Headquarters Germantown, MD * Until 12:10 PM -04 * At 11:25 AM -04...The Earth Networks Total Lightning Network is indicating a thunderstorm with a significant rate of lightning occurring in your area and moving in your direction. This storm has an increased potential to produce severe weather such as very frequent lightning, heavy rain, hail and/or damaging winds and should be considered dangerous. (For more information on this Earth Networks product visit www.earthnetworks.com) * Storm is located near Latitude: -18.888, Longitude: -61.812 * Repeating, this storm contains frequent lightning and has an increased potential to produce severe weather and should be considered dangerous. Take appropriate measures to ensure safety to life and property immediately. This alert is being issued in an advisory capacity by Earth Networks Headquarters due to the detection of frequent lightning by The Earth Networks Total Lightning Network. It is not associated in any way with the country's official meteorological services nor to any official alert linked to this storm. Active advisories or warnings issued by the official meteorological services should be followed in precedence to this alert. Stay tuned to www.earthnetworks.com, other Earth Networks applications or local media outlets for the latest severe weather information.
</description>
<instruction>
This storm contains frequent lightning and has an increased potential to produce severe weather and should be considered dangerous. Take appropriate measures to ensure safety to life and property immediately.
</instruction>
<contact>https://support.earthnetworks.com/ContactSupport</contact>

"Info" element and Sub-elements - continued

Elements	Description
Description	A complete bulletin that includes all the DTA information in a readable that mimics the National Weather Service warnings bulletin. You can use the bulletin as is or add to it other elements from the feed or any other custom content. The time is this element is the location local time in the following format: HH:MM AM/PM CST (3 letter time zone abbreviation.
Instruction	The text describing the recommended action to be taken by recipients of the alert message. The feed contains a generic instruction that can be customized before being delivered to the end user.
contact	The text describing the contact for follow-up and confirmation of the alert message.

EARTH NETWORKS

THE ALERT BULLETIN IN THE DESCRIPTION ELEMENT

An Earth Networks Dangerous Thunderstorm Alert is in effect until 12/31/2083 6:00 PM CST

Event Start: 5:05 AM CST
Event End: 6:00 PM CST

Earth Networks Dangerous Thunderstorm Alert (Experimental)
Earth Networks Headquarters Germantown, MD

* Until Saturday, January 01, 2084 6:00 PM CST

* At 5:05 AM CST...The Earth Networks Total Lightning Network is indicating a thunderstorm with a significant rate of lightning occurring in your area and moving in your direction. This storm has an increased potential to produce severe weather such as very frequent lightning, heavy rain, hail and/or damaging winds and should be considered dangerous. (For more information on this Earth Networks product visit www.earthnetworks.com)

* Storm is located near Leakesville, MS

* Repeating, this storm contains frequent lightning and has an increased potential to produce severe weather and should be considered dangerous. Take appropriate measures to insure safety to life and property immediately.

This alert is being issued in an advisory capacity by Earth Networks Headquarters due to the detection of frequent lightning by The Earth Networks Total Lightning Network. It is not associated in any way with the National Weather Service nor to any NWS warnings that may be linked to this storm. Active NWS advisories, if any, should be followed in precedence to this alert.

THE PARAMETER ELEMENT – CITIES & OBSERVATIONS

```
- <parameter>
    <valueName>RAINRATE_0</valueName>
    <value>New Augusta, MS, at BMNBS...0.6"/h at 11:43 AM CST</value>
  </parameter>
- <parameter>
    <valueName>WINDGUST_0</valueName>
    <value>New Augusta, MS, at BMNBS...SSE  29 mph 11:43 AM CST</value>
  </parameter>
- <parameter>
    <valueName>IMPACTED_CITY_0</valueName>
    <value>Chunchula, Alabama: 5:01 PM</value>
  </parameter>
- <parameter>
    <valueName>LIGHTNING_SEVERITY</valueName>
    <value>High</value>
  </parameter>
```

Elements	Description
parameter	An element that allow the alert originator to add information that cannot be included in the designated CAP elements. Each parameter element has two attributes: ValueName and Value.
RainRate_n	n=0-4. Up to 5 rain rate current observations. To be included, the station must be within 10 miles (18.5km) of the center of the cell and measure rain rate that equals or exceeds 0.5 inches (12.7mm) per hour. The value format is: **[station city], [station state or country], at [station ID]…[rain rate value] at [local time]**
Windgust_n	n=0-4. Up to 5 wind gust current observations. To be included, the station must be within 10 miles (18.5km) of the center of the cell and measure wind gust that equals or exceeds 15 mph (24.1kpm). The value format is: **[station city], [station state or country], at [station ID]…[wind gust value] at [local time]**
Impacted_City_n	Up to 5 cities that can be impacted by the DTA. (n=0-4) The cities' center point must reside within the alert polygon. The format of the value is: **[city name], [state or country], [estimated time of impact in local time value]**
Lightning_severity	DTA="High", Level 2 = "Medium", Level 1 = Low

EARTH NETWORKS

THE PARAMETER ELEMENT – CITIES & OBSERVATIONS

```
- <parameter>
    <valueName>CELL_POLYGON</valueName>
    <value>POLYGON ((-88.6161460282811 31.104253889891652, -88.611343410814925 31.107747509424613, -
      88.6161460282811 31.111446095865961, -88.6214904436597 31.107747509424613, -88.6161460282811
      31.104253889891652))</value>
  </parameter>
- <parameter>
    <valueName>DIRECTION</valueName>
    <value>349</value>
  </parameter>
- <parameter>
    <valueName>SPEED</valueName>
    <value>29 mph</value>
- <parameter>
    <valueName>IMPACTED_COUNTY_0</valueName>
    <value>Mobile County, Alabama</value>
  </parameter>
```

"Parameter" elements - continued

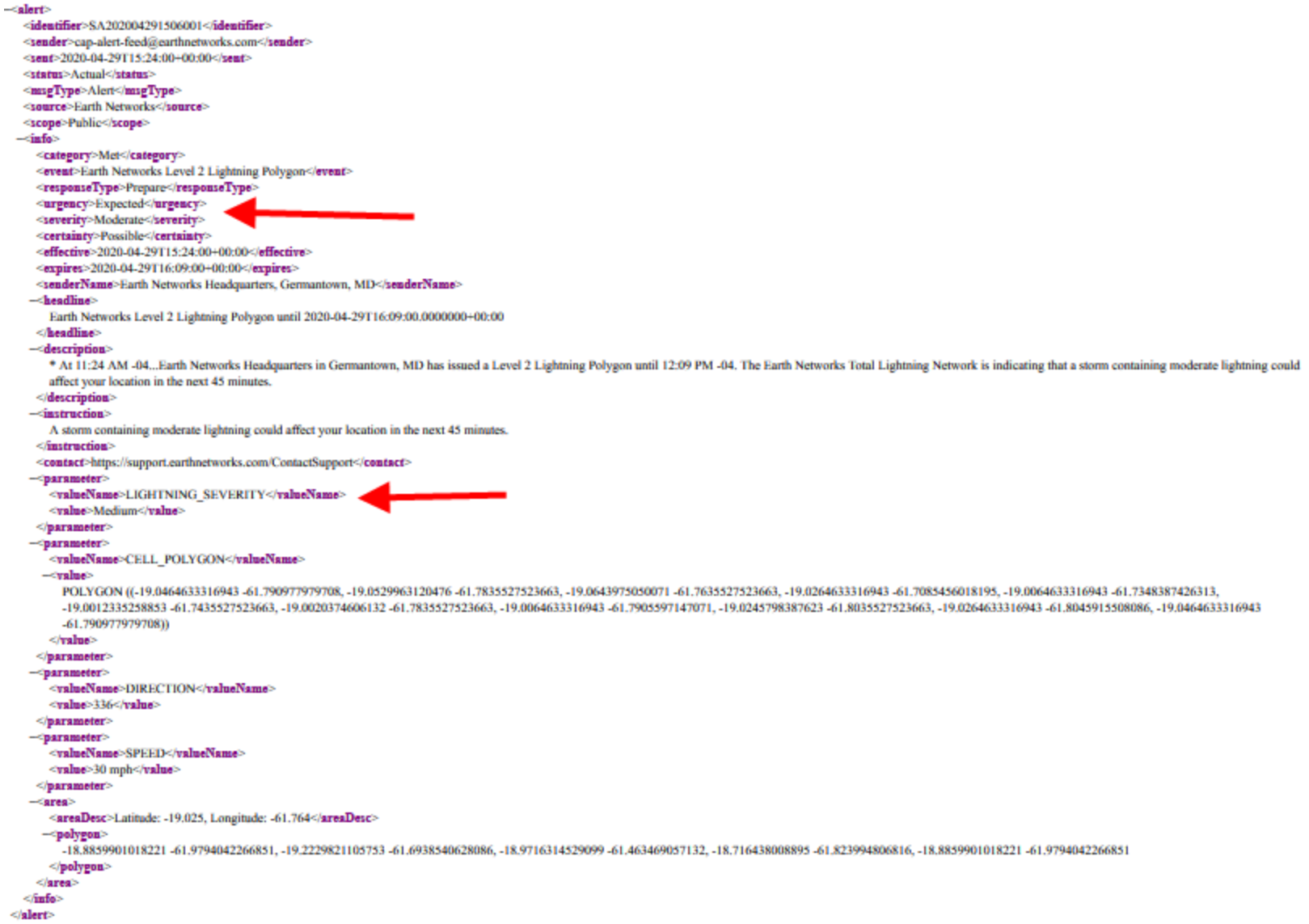
Elements	Description
Cell_Polygon	The geographic boundary of the cell that is causing the severe weather.
Direction	The direction of the cell in degrees unit.
Speed	n=0-4. Up to 5 wind gust current observations. To be included, the station must be within 10 miles (18.5km) of the center of the cell and measure wind gust that equals or exceeds 15 mph (24.1kpm). The value format is: **[station city], [station state or country], at [station ID]…[wind gust value] at [local time]**
Impacted_County_n	Optional parameter element that will be delivered when the area has defined sub-regions in ENTLN system – such and counties in the US. Format: **[County the intersect with DTA polygon], [State or Country]**

AREA ELEMENT AND SUB-ELEMENTS

```
- <area>
    <areaDesc>Leakesville, Mississippi</areaDesc>
    <polygon>-88.7310928758979 31.136866672074291, -88.176839082892144 30.832893499940326, -
      88.063390230635832 31.143323808730763, -88.683037494314647 31.268360703501152, -
      88.7310928758979 31.136866672074291</polygon>
  - <geocode>
      <valueName>ZipCode</valueName>
      <value>36571</value>
```

Elements	Description
Area	A grouping element that provide all the spatial information regarding to the area where the alert was issued for. The “area” element may contain one or multiple instances of <polygon>, or <geocode>. If multiple <polygon> or <geocode> elements are included, the area described by this <area> block is represented by the union of all the included elements.
Polygon	The DTA polygon verteces in lat/long units. Do not confuse with the Cell Polygon. The area polygon covers the affected area through the duration of the alert.
Speed	n=0-4. Up to 5 wind gust current observations. To be included, the station must be within 10 miles (18.5km) of the center of the cell and measure wind gust that equals or exceeds 15 mph (24.1kpm). The value format is: **[station city], [station state or country], at [station ID]…[wind gust value] at [local time]**
geocode	Optional element. This element currently holds the US zip codes that intersects with the DTA polygon.

LEVEL 2 SAMPLE ALERT ELEMENTS & SUB-ELEMENTS



```
<alert>
  <identifier>SA20200429150600l</identifier>
  <sender>cap-alert-feed@earthnetworks.com</sender>
  <sent>2020-04-29T15:24:00+00:00</sent>
  <status>Actual</status>
  <msgType>Alert</msgType>
  <source>Earth Networks</source>
  <scope>Public</scope>
  <info>
    <category>Met</category>
    <event>Earth Networks Level 2 Lightning Polygon</event>
    <responseType>Prepare</responseType>
    <urgency>Expected</urgency>
    <severity>Moderate</severity>
    <certainty>Possible</certainty>
    <effective>2020-04-29T15:24:00+00:00</effective>
    <expires>2020-04-29T16:09:00+00:00</expires>
    <senderName>Earth Networks Headquarters, Germantown, MD</senderName>
    <headline>
      Earth Networks Level 2 Lightning Polygon until 2020-04-29T16:09:00.0000000+00:00
    </headline>
    <description>
      * At 11:24 AM -04...Earth Networks Headquarters in Germantown, MD has issued a Level 2 Lightning Polygon until 12:09 PM -04. The Earth Networks Total Lightning Network is indicating that a storm containing moderate lightning could
      affect your location in the next 45 minutes.
    </description>
    <instruction>
      A storm containing moderate lightning could affect your location in the next 45 minutes.
    </instruction>
    <contact>https://support.earthnetworks.com/ContactSupport</contact>
    <parameter>
      <valueName>LIGHTNING_SEVERITY</valueName>
      <value>Medium</value>
    </parameter>
    <parameter>
      <valueName>CELL_POLYGON</valueName>
      <value>
        POLYGON ((-19.0464633316943 -61.790977979708, -19.0529963120476 -61.7835527523663, -19.0643975050071 -61.7635527523663, -19.0264633316943 -61.7085456018195, -19.0064633316943 -61.7348387426313,
        -19.0012335258853 -61.7435527523663, -19.0020374606132 -61.7835527523663, -19.0064633316943 -61.7905597147071, -19.0245798387623 -61.8035527523663, -19.0264633316943 -61.8045915508086, -19.0464633316943
        -61.790977979708))
      </value>
    </parameter>
    <parameter>
      <valueName>DIRECTION</valueName>
      <value>336</value>
    </parameter>
    <parameter>
      <valueName>SPEED</valueName>
      <value>30 mph</value>
    </parameter>
    <area>
      <areaDesc>Latitude: -19.025, Longitude: -61.764</areaDesc>
      <polygon>
        -18.8859901018221 -61.9794042266851, -19.2229821105753 -61.6938540628086, -18.9716314529099 -61.463469057132, -18.716438008895 -61.823994806816, -18.8859901018221 -61.9794042266851
      </polygon>
    </area>
  </info>
</alert>
```

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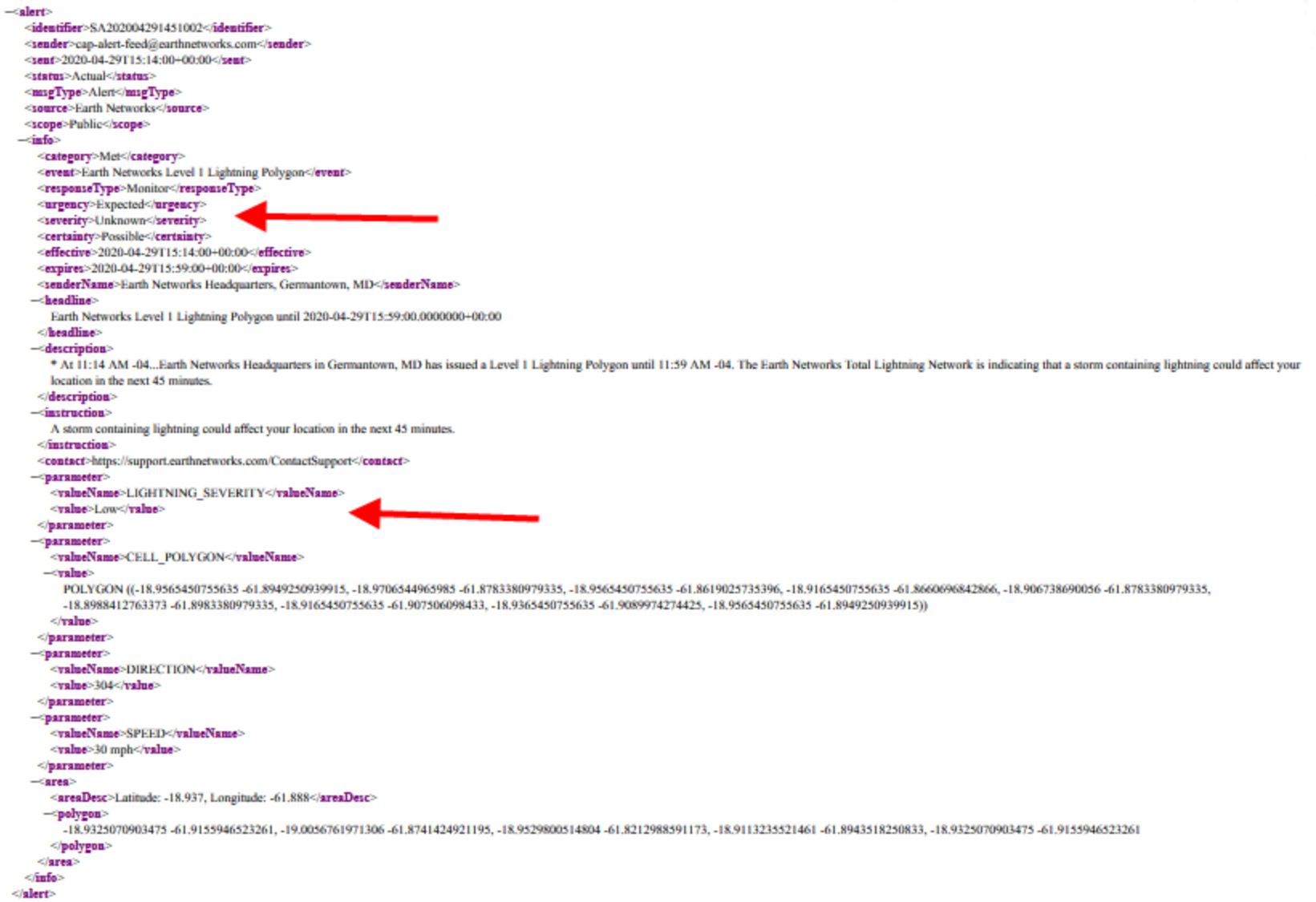
LEVEL 1 SAMPLE ALERT ELEMENTS & SUB-ELEMENTS



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FREQUENTLY ASKED QUESTIONS

- Is the feed available globally?
  - Yes. However it is unlikely that DTAs will be detected in areas with a low density of sensors.
- Does the call returns ALL the cells within the given boundary box?
  - No. The call will return only cells that meet the requested threshold level/s.
- Are there different thresholds for different regions of the world?
  - No. At the moment there are 3 global thresholds.
- Are other sub-regions such as postal codes are supported
  - No. To be supported, these regions must be first loaded and geo-coded in the system.

FREQUENTLY ASKED QUESTIONS

- Is there a limitation to the size of the boundary box?
  - The size of the bounding box needs to be smaller than a single hemisphere.
- Which cities are included in the DTA CAP feed?
  - Only cities with a center point inside the DTA polygon.
- Which observations are included?
  - Up to 5 stations within 10 miles from the center of the storm cell that report 0.5” (12.7 mm) rain rate or above.
  - Up to 5 stations within 10 miles from the center of the storm cell that report Wind Gust of 15mph (24.1kph) or above.