

## VIPER: Technical Requirements of a Generic CAP Stream Source and HTTPS POST

### Contents

Overview .....	2
Storing a set of Sensor Readings in CAP XML .....	2
1. Required Elements.....	2
a. alert\identifier Element:.....	2
b. alert\source Element:.....	2
c. alert\sent Element .....	2
d. alert\info\area\circle Element .....	3
e. alert\info\headline Element.....	3
2. Optional Elements.....	3
a. alert\sender Element .....	3
b. alert\info\parameter Element .....	3
3. Sample CAP XML .....	4
<a href="https://viper.response.epa.gov/CAP/post">HTTPS POST CAP XML to https://viper.response.epa.gov/CAP/post</a> .....	4
1. HTTPS = HTTP over TLS/SSL.....	4
a. TLS - Transport Layer Security .....	4
2. HTTP Basic Authentication .....	4
a. HTTP Authorization header .....	4
b. Base64-encoded bytes of "[username]:[password]" .....	4
c. Example Authorization Header: .....	4
3. Content-Length header required .....	4
4. CAP XML in request body.....	4
Test a Working Example.....	5
1. Testing Order: .....	5
2. Establish openssl connection .....	5
3. Copy & paste http request example below: .....	5
4. Observe Success or Failure .....	6

## **Overview**

A Generic CAP Stream Source is software that sends either real-time or historical instrument readings as a stream of Common Alerting Protocol (CAP) XML messages over a series of HTTPS POST requests.

A Generic CAP Stream Source does not have to meet all of the Technical Requirements of a MeterApp. The following are the only requirements:

### **Step 1. Store a set of sensor readings in CAP XML**

- A ProjectID will need to be included in the “alert/source” section of the XML. Contact ERT Support to receive a ProjectID

### **Step 2. HTTPS POST the CAP XML to <https://viper.response.epa.gov/CAP/post>**

- Readings MUST be sent in chronological order.
- A username and password are required. Please contact ERT Support to receive a username and instructions on completing account registration.

## **Step 1 - Storing a set of Sensor Readings in CAP XML**

### **1. Required Elements**

#### **a. alert\identifier Element:**

- (1) Definition: A string representation of a unique identifier for this CAP message.
- (2) Details: Each CAP XML message needs a unique ID
- (3) Example: <identifier>281005951\_634498074648864996</identifier>

#### **b. alert\source Element:**

- (1) Definition: A string of four (4) comma-delimited values indicating the source of sensor readings
- (2) Details: The source Element is to be provided in the format of:

[instrument\_type],[stream\_identifier],[Project\_ID],[user\_defined]

- [Instrument\_Type] user provided name for the type of instrument sending data
  - [stream\_identifier] user provided string to uniquely identify the data stream
  - [Project\_ID] Contact ERT Support for a Project ID
  - [user\_defined] If no additional user\_defined string is needed, this can be an empty string
- (3) Example: ACME Particulate Monitor,APM\_S/N\_123456,R02EPA\_AcmeCreekSpill,0

#### **c. alert\sent Element**

- (1) Definition: A date/time string indicating when the reading(s) were taken
- (2) Details: The date/time string must include the time zone offset
  - Time zone offset must include two digits for the hour
  - UTC time is accepted, with a time zone offset of -00:00
- (3) Example: 2010-05-28T15:52:27-05:00

#### **d. alert\info\area\circle Element**

- (1) Definition: A string with the WGS84 coordinates of the reading  
(2) Details: Required if the stream is transmitting readings from a mobile instrument. May also include fixed coordinates if known.

- Must be WGS84 coordinates in the format of:

"[latitude],[longitude] 0"

- (3) Example: 40.5139080,-74.3582950 0

#### **e. alert\info\headline Element**

- (1) Definition: A semi-colon delimited string of multiple sets of "sensor name, reading, units, and alarm state"

- (2) Details: String must be in the format of:

[sensor name];[sensor reading];[sensor units];[Green | Yellow | Red];[repeat for each sensor]

- (3) Example: Example: ConcRT;0.001;mg/m3;Green;ConcHr;0;mg/m3;Green;

## **2. Optional Elements**

#### **a. alert\sender Element**

- (1) Definition: A string indicating the source of the CAP message  
(2) Details: Possibilities include organization name or instrument manufacturer  
(3) Example: <sender>ACME Device Corp</sender>

#### **b. alert\info\parameter Element**

- (1) Definition: Section for including a custom parameter name and value. Currently, GPSDOP and BatteryLevel are the only recognized parameter Elements.  
(2) Details: must include a "ValueName" Element and a numeric "value" Element
- (a) "ValueName" Element**
- (i) Definition: String name  
(ii) Details: "GPSDOP" or "BatteryLevel"
- (b) "value" Element**
- (i) Definition: User provided number related to the "ValueName"  
(ii) Details: Any numeric Value  
(iii) Example for GPSDOP: A number between 1 and 25 indicating the accuracy of the WGS84 coordinates, where 1 is best.  
(iv) Example for BatteryLevel: A number representing the battery percentage
- (3) Example: <parameter><ValueName>GPSDOP</ValueName><value>3</value></parameter>  
(4) Example: <parameter><ValueName>BatteryLevel</ValueName><value>75</value></parameter>

### 3. Sample CAP XML

```
<?xml version="1.0" encoding="utf-8"?>
<alert xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema"
        xmlns="urn:oasis:names:tc:emergency:cap:1.1">
  <identifier>281005951_634498074648864996</identifier>
  <sender>My Device</sender>
  <sent>2011-08-19T15:31:07-04:00</sent>
  <source>Acme Particulate Monitor,APM S/N 123456,0,0</source>
  <info>
    <headline>ConcRT;0.001;mg/m3;Green;ConcHr;0;mg/m3;Green;</headline>
    <area>
      <circle>38.904722, -77.016389 0</circle>
    </area>
  </info>
</alert>
```

Note: Contact ERTSupport for tools that can help validate your XML

## **Step 2 - HTTPS POST CAP XML to <https://viper.response.epa.gov/CAP/post>**

### 1. HTTPS = HTTP over TLS/SSL

#### a. TLS - Transport Layer Security

- Requires TLS v1.2

### 2. HTTP Basic Authentication

#### a. HTTP Authorization header

- "Basic" scheme

#### b. Base64-encoded bytes of "[username]:[password]"

- Username - Contact ERTSupport@epa.gov to receive a username
- Password - Account holder will create the password during account registration
- Example: VXNlcm5hbWU6UGFzc3dvZA==

#### c. Example Authorization Header:

- "Authorization: Basic VXNlcm5hbWU6UGFzc3dvZA=="

### 3. Content-Length header required

- Size of request body (i.e. CAP XML), in bytes
- Content-Length is the length of the request body (including line endings)

### 4. CAP XML in request body

- Follow Instructions in Section 1 of this Document

## **Test a Working Example**

- Use “openssl” with the “request example” below to achieve a “successful” post.
  1. Testing Order:
    - Establish Connection
    - Paste Entire “Request Example” (with your encoded credentials)
    - Press Enter
    - Observe “HTTP/1.1 200 OK” response
  2. Establish openssl connection
    - `openssl s_client -connect viper.response.epa.gov:443`

### **3. Copy & paste http request example below:**

POST /CAP/post HTTP/1.1

Host: viper.response.epa.gov

Authorization: Basic **SUPPLY\_YOUR\_ENCODED\_CREDENTIALS\_HERE**

Content-Length: 570

Connection: Keep-Alive

```
<?xml version="1.0" encoding="utf-8"?>
<alert xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xmlns:xsd="http://www.w3.org/2001/XMLSchema"
      xmlns="urn:oasis:names:tc:emergency:cap:1.1">
  <identifier>281005951_634498074648864996</identifier>
  <sender>My Device</sender>
  <sent>2011-08-19T15:31:07-04:00</sent>
  <source>Acme Particulate Monitor,APM S/N 123456,0,0</source>
  <info>
    <headline>ConcRT;0.001;mg/m3;Green;ConcHr;0;mg/m3;Green;</headline>
    <area>
      <circle>38.904722, -77.016389 0</circle>
    </area>
  </info>
</alert>
```

## 4. Observe Success or Failure

### Example of a Successful Post

```
POST /CAP/post HTTP/1.1
Host: viper.response.epa.gov
Authorization: Basic [REDACTED]
Content-Length: 547
Connection: Keep-Alive

<?xml version="1.0" encoding="utf-16"?>
<alert xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="urn:oasis:names:tc:emergency:cap:1.1">
  <identifier>281005951_634498074648864996</identifier>
  <sender>My Device</sender>
  <sent>2013-08-19T15:31:08-04:00</sent>>
  <source>Acme Particulate Monitor,APM S/N 123456,0,0</source>
  <info>
    <headline>ConcRT;0.001;mg/m3;Green;ConcHr;0;mg/m3;Green;</headline>
    <area>
      <circle>38.904722, -77.016389 0</circle>
    </area>
  </info>
</alert>

HTTP/1.1 200 OK
Cache-Control: private
Server: Microsoft-IIS/8.5
X-AspNet-Version: 4.0.30319
X-Powered-By: ASP.NET
Strict-Transport-Security: max-age=31536000
Date: Tue, 03 Mar 2020 17:56:54 GMT
Content-Length: 0
```

Request

Success

Response

In the Response section,  
note the HTTP/1.1 200 OK  
  
This is the only indication of  
success

### Example of a Failed Post

In the Response section, note the HTTP/1.1 400 Bad Request

```
POST /CAP/post HTTP/1.1
Host: viper.response.epa.gov
Authorization: Basic [REDACTED]
Content-Length: 546
Connection: Keep-Alive

<?xml version="1.0" encoding="utf-16"?>
<alert xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="urn:oasis:names:tc:emergency:cap:1.1">
  <identifier>281005951_634498074648864996</identifier>
  <sender>My Device</sender>
  <sent>2013-08-19T15:31:08-04:00</sent>>
  <source>Acme Particulate Monitor,APM S/N 123456,0,0</source>
  <info>
    <headline>ConcRT;0.001;mg/m3;Green;ConcHr;0;mg/m3;Green;</headline>
    <area>
      <circle>38.904722, -77.016389 0</circle>
    </area>
  </info>
</alert>

HTTP/1.1 400 Bad Request
Cache-Control: private
Content-Type: text/html
Server: Microsoft-IIS/8.5
X-AspNet-Version: 4.0.30319
X-Powered-By: ASP.NET
Strict-Transport-Security: max-age=31536000
Date: Tue, 03 Mar 2020 17:59:09 GMT
Content-Length: 11
```

Failure