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A guide to working with the Common Alert Protocol (CAP) messages using the CAP Adaptor for GeoEvent Processor for ArcGIS Server

Tutorial: Configuring the CAP Adapter for GeoEvent Processor

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# Deploying and Configuring the CAP Adapter

## Create CAP Feature Service

In ArcCatalog, browse to the CAP Adapter location and double click on the CAPAlerts.mpk. A map document with configured tables and feature class will open.[[1]](#footnote-1) You will need to export all tables and the feature class to an enterprise geodatabase and referencing the new tables and feature class in your map document before moving on to the next step. Once exported and the layers reference data in the enterprise geodatabase save the map document. In ArcMap right click the file tab and select ‘Share’. In the sharing options choose ‘Share as Service’. Follow the dialog instructions to create the service. In the service editor’s ‘Capabilities’ tab make sure you select ‘Feature Access’ and in the ‘Feature Access’ subfolder make sure the checkbox next to ‘Apply default z-value’ is checked. Click the ‘Analyze’ button and fix any resulting errors. Once errors are resolved, click the ‘Publish’ button to create the feature service.

## Deploy CAP Adaptor

In a file browser, go to the location where you unzipped the Cap-Adapter files. Find the cap-adapter-10.2.0.jar file. Copy this file and go to <GeoEvent Processor Install Location>/deploy. Paste the jar file into the deploy folder.

In GeoEvent for ArcGIS Server’s GeoEvent Manager Application select the ‘Site’ tab (2nd tab on the upper right). You will see all of the GeoEvent Definitions that are registered on your site. Notice that when you deployed the adapter, a number of GeoEvent Definitions were created for you.

The following geoevent definitions should be displayed:

CAPAlert, CAPAlertCode, CAPInfo, CAPInfoArea, CAPInfoAreaGeom, CAPInfoCategory, CAPInfoEventCode, CAPInfoParameter, CAPInfoResource, and CAPInfoResponseType

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| GeoEvent Definitions Created upon deploying CAP Adaptor |

Depending on the CAP message that is received any or all of these events may be generated.

## Create CAP-Http connector

Once you have deployed the CAP Adapter, you must create a connector from the CAP adapter and one of the available transports (depending on the method for which your feed transmits CAP messages). Typically you will want to couple the CAP Adapter with the http transport. For the purposes of this demo we will use the HTTP transport, so that we can receive CAP messages from a live feed transmitting over the internet.

Next go to the menu selection on the left of manager and click ‘Connectors’. In GeoEvent Processor for ArcGIS Server, a connector is defined as a pairing of an adapter and transport. Both adapters and transports are further defined as inbound or outbound. An inbound connector comprises an inbound adapter and inbound transport. Here we will be creating a connector from the CAP Inbound adapter and the HTTP inbound transport.

Press the ‘Create Connector’ button that appears above the list of available connectors. A dialog similar to the one below will be displayed. Items with a red asterisk are required fields. Provide a unique name for the processor (no spaces and the only special characters allowed are dashes and underscores). Provide a human readable label. Provide an optional description. Make sure that ‘Input’ is selected’ for type. In the Adapter and Transport dropdowns select ‘CAP’ and ‘HTTP’ respectively. Next provide a Default Input Name (new instances of the connector will have this name unless changed by the user).

The next step is to configure the properties of the connector. The configure properties dialog’s properties may be moved from the ‘Shown’, Advanced’ and ‘Hidden’ windows, using the arrows.

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| Configuring the CAP input Connector |
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Configure the properties as shown in Figure 1. Once configured click ‘Save’. The CAP-HTTP inbound connector should appear in the list of connectors on your Geoevent Server site.

## Create a Test Input Service

For testing purposes you will create an input Service that allows GeoEvent Processor for ArcGIS Server to listen for CAP alerts on a rest endpoint. You can use Fire Fox Poster or a similar development tool to send simulated CAP alerts to the endpoint to test that it is working properly.

In GeoEvent Manager go to Services->Input. Click the ‘Add Input’ button. Click the ‘Select’ button next to the option ‘Receive CAP Alerts’. In the dialog configure the input service with the following properties:

|  |  |
| --- | --- |
| **Configuring the CAP-http Test Input Service** | |
| **Name** | CAP-http |
| **Mode** | SERVER |
| **HTTP METHOD** | POST |

## Create a Test Output Service

Now you will create a Service to output CAP Alerts in a json file. Click ‘Add Output’. Click ‘Select’ next to the ‘Write to .json file’ connector. Fill in the properties as follows and click 'Save':

|  |  |
| --- | --- |
| **Configuring the CAP-json-out Service** | |
| **Name** | CAP-json-out |
| **Folder** | <connection to a registered folder> |
| **Filename prefix** | cap |

## Create A Test GeoEvent Service

Now that you have both input and output services, you can create a simple GeoEvent service to test the CAP Adapter. In the GeoEvent Manager Application go to Services->GeoEvent Services. Click The ‘Add Service’ button. For the service’s name type ‘CAP-http-Test’ and for the service description type ‘Simple service to test receipt of Common Alert Protocol messages’ then click ‘Create’. You will now see the Service Designer window. On the left hand side you will see a list of all of your available input and output services. Select the CAP-http input service and drag it into the Service Designer window. A green box will be displayed in the window that represents the CAP-http input service. Next select the CAP-json-out output service and drag it into the Service Designer window. A blue box will be displayed in the window that represents the CAP-json-out output service. Hover over the input service graphic and an arrow will appear on the right-hand side of the graphic. Click the arrow and drag the mouse to the output service. A connector graphic will be drawn between the input and output service indicating that the 2 services are connected. This means that CAP messages consumed by the CAP-http service will be processed and then passed to the CAP-json-out service. Now click ‘Publish’ to save the CAP-http-Test GeoEvent service.

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| Creating the CAP-http-Test GeoEvent Service |

## Testing the CAP-http-Test Service

Once you have created the CAP-http-Test service you are ready to test the CAP-Adapter. For this tutorial we will use Fire Fox poster to pass a simulated CAP message to the rest endpoint of the CAP-http input service. The message will be converted into a geoevent by the CAP-http input and then passed to the CAP-json-output service which will write the geoevent to a file in json format. While this tutorial uses Fire Fox Poster any similar freely available developer tool will suffice.

The first step is to open Fire Fox Poster and put enter the rest endpoint of your input service in the URL field. The URL will be in the form https://<your host>:6143/geoevent/receiver/CAP-http. Next go to the location where you unzipped the CAP-Adapter files. Browse to a folder called simulation and in a text editor open CAP-GDACS.xml. Copy and paste the contents of the CAP-GDACS.xml file into the content window of Fire Fox Poster. Note that the Poster automatically detects the content type of the content and updates the Content Type field to ‘text/xml’. Click the ‘POST’ button. A new window will appear that will display the status of your html request.[[2]](#footnote-2)

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| Testing the CAP-http-Test Service with Fire Fox Poster |
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Once you have successfully sent a request to the CAP-http rest endpoint, open the Manager Application for GeoEvent Processor for ArcGIS Server. Go to Services->Monitor. Next to The CAP-http-in service note that the service has receives 24 input events and 24 output events. In Fire Fox Poster click POST once more. Notice that no new inputs and outputs are created. This is by design. The CAP-Adapter restricts the receipt of multiple notices with the same identifier.

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| GeoEvent Processor Monitor After Testing the CAPP-http-Test Service |
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# Appendix A: Memory Management for the CAP Adaptor

Depending on the amount of traffic channeling through the CAP system, the resources of your system may be taxed. This is especially the case if you are deploying the CAP adaptor on a laptop or desktop machine for development purposes and when large weather events are occurring in the US. If too many CAP events are input to the system in a short period of time, the GeoEvent server may crash because it runs out of memory. In any test/development environment (i.e. one in which the machine on which the CAP Adaptor is deployed has limited resources) it is advisable to shut down the CAP input connector when not in use or being tested. This will prevent the geoevent server from being overwhelmed by CAP alerts.

Another thing that can improve performance is to increase your JVM’s maximum heap size. Since GeoEvent Server run’s inside an Apache Karaf environment, you can increase the JVM heap size by setting the JAVA\_MAX\_MEM environmental variable, set or reset the variable to a larger number. Typically JAVA\_MAX\_MEM=2048M is a good place to start (on a machine with 8G of RAM this will consume 2G max of RAM). Another option is to set the JAVA\_MAX\_MEM inside the karaf.bat file that is used to instantiate the server. Open the <ges install location>/bin/karaf.bat file as an administrator in a text editor. Search for the string ‘JAVA\_MAX\_MEM’. You will see the following command:

if "%JAVA\_MAX\_MEM%" == "" (

set JAVA\_MAX\_MEM=1024M

)

This command tells Karaf to set the max heap size of the Java Virtual Machine to 1024 Megabytes if the environmental variable JAVA\_MAX\_MEM is not set. Set this to a larger power of 2 to allow a greater amount of RAM be dedicated to the JVM (make sure the environmental variable JAVA\_MAX\_MEM is not already set to a smaller value).

# Appendix B: Deploying the CAP Adaptor in IPAWS

## Before Deploying the CAPS Adaptor with IPAWS

In this tutorial you will connect to a live stream of Common Alerting Protocol (CAP) alerts broadcast by the Federal Emergency Management Agency (FEMA). Before deploying the adaptor your organization must obtain an Integrated Public Alerting Systems (IPAWS) OPEN Developers pin id. The pin will be passed into the adaptor as an http parameter in order to get the CAP stream. To obtain the pin a Memorandum of Agreement (MOA) must be obtained and executed through FEMA. Details for obtaining the MOA can be found at <http://www.fema.gov/media-library-data/20130726-1917-25045-5128/how_to_sign_up_for_ipaws_fact_sheet_20130517.pdf>.

## Create Input Service that connects to IPAWS

Now that you have created an input connector you can create an input service. In Geoevent Manager for ArcGIS Server click on the services tab and select ‘Inputs’ from the service tabs. Next select ‘Add Service’. You will now see a list of the available input service connectors that are available. Choose the CAP connector that you just created (note: it will be sorted by the label you gave the connector when you created it). Assign the properties as follows:

|  |  |
| --- | --- |
| Configuring CAP-FEMA-http Input Service | |
| **Name** | CAP-FEMA-http |
| **URL** | <https://tdl.apps.fema.gov/IPAWSOPEN_EAS_SERVICE/rest/public/recent/2012-08-21T11:40:43Z> [[3]](#footnote-3) |
| **Parameters** | pin=<your FEMA pin> |
| **Frequency (in seconds)** | 5 |
| **Use URL Proxy** | No |
| **Acceptable Mime Types** | application/xml |
| **HTTP Method** | ‘GET’ |

When you have added all properties click ‘Save’. You will now start receiving CAP messages from the FEMA endpoint.[[4]](#footnote-4) In the ‘Services’ Tabs select ‘Monitor’. You will see CAP messages appear as they are posted to the FEMA website.[[5]](#footnote-5)

## Create Output Services

Next you will need to create some output services for your CAP service. For this tutorial, you will create an output table for each of the tables in present in the CAP-Alerts Feature Service, an output service for the Alert Areas layer of the CAP Alerts Feature Service, and a json output of the CAPS Alerts.

From the Services tab, select ‘Outputs’ and click the ‘Add Output’ button. You will see a list of the output connectors available to your site. Click the ‘Select’ button next to the connector labeled ‘Update a Feature’. Fill in the service properties as follows:

|  |  |
| --- | --- |
| Configuring the CAPAlert-fs-out Service | |
| **Name** | CAPAlert-fs-out |
| **ArcGIS Server Connection** | <connection to ags hosting CAP Service> |
| **Folder** | <Folder location of CAP Service> |
| **Service Name** | CAP\_Alerts |
| **Layer** | Alert |
| **Unique Feature Identifier Field** | Message ID |
| **Update Interval** | 1 |
| **Generate Flat JSON** | Yes |
| **Delete Old Features** | No |
| **Maximum Features per Transmission** | 500 |

Next you will create 8 more services that will update the CAP tables in the CAP-Alert Service. For each click the copy icon next to the output service you just created. Change the name and layer properties as follows:

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| --- | --- | --- |
| Configuring Table Update Output Services | | |
| **Output Service 1** | Output Service Name: | CAPAlertCode-fs-out |
|  | Layer | AlertCode |
| **Output Service 2** | Output Service Name | CAPInfo-fs-out |
|  | Layer | Info |
| **Output Service 3** | Output Service Name | CAPInfoCategory-fs-out |
|  | Layer: | InfoCategory |
| **Output Service 4** | Output Service Name | CAPInfoEventCode-fs-out |
|  | Layer | InfoEventCode |
| **Output Service 5** | Output Service Name | CAPInfoParameter-fs-out |
|  | Layer | InfoParameter |
| **Output Service 6** | Output Service Name | CAP InfoResponseType -fs-out |
|  | Layer | InfoResponseType |
| **Output Service 7** | Output Service Name | CAPInfoArea-fs-out |
|  | Layer | InfoArea |
| **Output Service 8** | Output Service Name | CAPInfoResource-fs-out |
|  | Layer | InfoResource |

Next click ‘Add Output’. From the selection of available output connectors select ‘Update a Feature’. Fill in the properties as follows and Save:

|  |  |
| --- | --- |
| Configuring CAPInfoAreaGeometry-fs-out Service | |
| Name | CAPInfoAreaGeometry-fs-out |
| **ArcGIS Server Connection** | <connection to ags hosting CAP Service> |
| **Folder** | <Folder location of CAP Service> |
| **Service Name** | CAP\_Alerts |
| **Layer** | Alert Areas |
| **Unique Feature Identifier Field** | Area ID |
| **Update Interval** | 1 |
| **Generate Flat JSON** | Yes |
| **Delete Old Features** | No |
| **Maximum Features per Transmission** | 500 |

If you have not already done so, create an output service to write CAP Alert messages to a json file. See the section entitled Create a Test Output Service for instructions on how to do this.

## Create the CAP GeoEvent Service

Now that you have finished creating the input and output services you can create the CAP Geoevent Service. A configured service is provided for you in the docs folder that was downloaded from github. In GeoEvent Processor Manager click on the ‘Site’ tab. And go to the ‘Configuration Store’. Click the ‘Import Configuration’ Button. In the popup dialog click ‘Choose File’ and browse to the <Cap Adaptor Location>/doc/CAPService.ges. Click Import. Click the Services Tab and go to ‘GeoEvent Services’. The CAP Service will be listed among the available services. If not already started, start the Cap service.[[6]](#footnote-6)

Congratulations, you have created a CAP Service!

1. The feature class and tables will not have records at this time. [↑](#footnote-ref-1)
2. If you use a browser other than Fire Fox by default and since the rest endpoint you are posting to is secure you will need to make sure that you update the certificates for Fire Fox so that the request will not be blocked. [↑](#footnote-ref-2)
3. The date in the URL does not reference the date of CAP messages. Messages will be live, however, a date in this format must be present in the URL. [↑](#footnote-ref-3)
4. Depending on the amount of CAP activity, it may take some time before you receive cap alerts. [↑](#footnote-ref-4)
5. In times of a great deal of activity the CAP adapter may consume a large amount of resources. See Appendix A for memory management. [↑](#footnote-ref-5)
6. If any of the import or output services do not have the exact name as demonstrated in this tutorial or are missing, you will receive an error starting the service. Go back and rename or create the offending services. [↑](#footnote-ref-6)