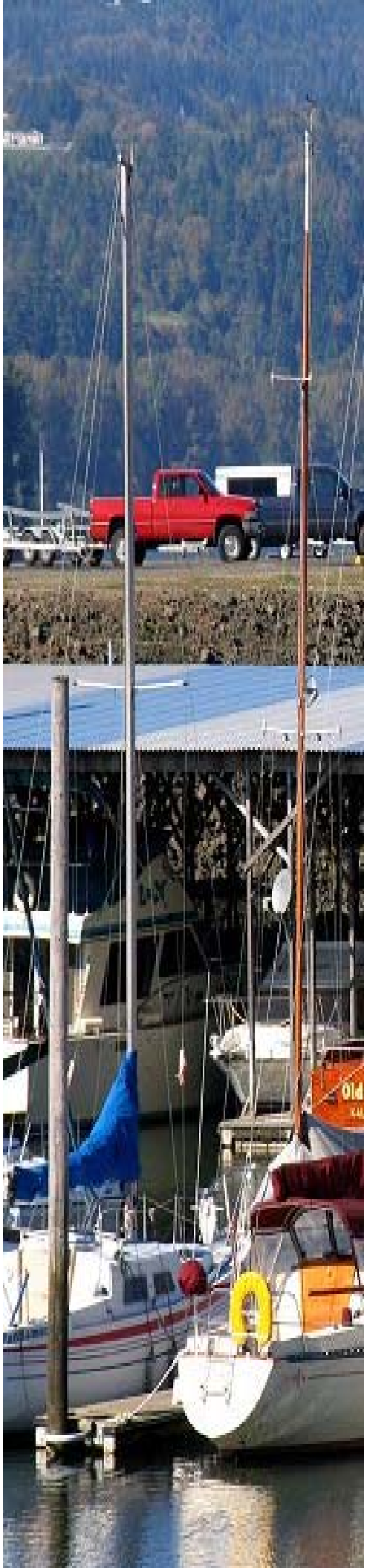

Washington State Department of Ecology

GeoGML Location Finder

Exchange Network Execute Flow

Dept. of Ecology

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Amendment Record

Version	Date	Amended By	Nature of Change
Version 1.0	March 28, 2011	M Neale	Preparation of the document for initial release.

Exchange Network Information

Common Data Services

Business Problem:

Washington State undertook the Washington Location Finder Project to achieve the following goals:

- Increase the accuracy of location-based information accessed and submitted for environmental review, permit application, and agency decision-making purposes.
- Provide ease-of-use enhancements to existing and planned on-line permit applications where applicants are required to provide place-based information.
- Provide standardized, repeatable methods for assigning the required place-based information required by on-line permitting and reporting applications.

One of the ease-of-use tools needed was one to automatically populate environmental conditions present at a user-defined location. This information is required for assessment and conditioning of the proposed action, and is often difficult for the permit applicant to determine. One example is the determination of whether a proposed action will impact a waterbody which under the Clean Water Act (CWA) has been listed as not meeting standards. These data are often available in GIS data sets which have traditionally required the use of desktop GIS software to interpret. The service described below implements a set of web tools which allow this and other data to be identified and reported to the user.

Business Scenario:

When determining NPDES permit conditions in Washington the CWA listing status of the receiving water must be determined. For a NPDES Outfall location the permit database application can invoke the service with Latitude-Longitude &

Washington Water Quality Assessment 2008 GIS layer name as parameters. The service will intersect water quality assessment geo-dataset with the Latitude-Longitude pair; then return Water Quality Assessment 2008 listing category and listed water quality parameters in place at the location. This information can then be used to specify the conditions on the NPDES permit.

Scope of this Document:

This document covers the flow configuration for the Execute GeoProcessing services. This is one of many services developed by the Washington Location Finder Project.

Similar Work:

This document describes the implementation of specific geo-spatial data services using an Exchange Network principles and protocols. Concurrent with this project the Open Geospatial Consortium (OGC) developed a set of standards addressing this topic (OpenGIS Web Processing Service). This project did not attempt to implement the letter of these standards due to their complexity and the timing of their release. This project does implement the intent.

Service Description:

One common data service has been specified to be provided by the Location Finder Flow Data Exchange (Exchange) node.

- getGML

Additional data services are expected to be developed as the Exchange becomes operational to satisfy application design needs.

Figure 1 illustrates how these data services will be supported within the Exchange partner network node architecture, and how the required information will flow from the data source to the information requestor.

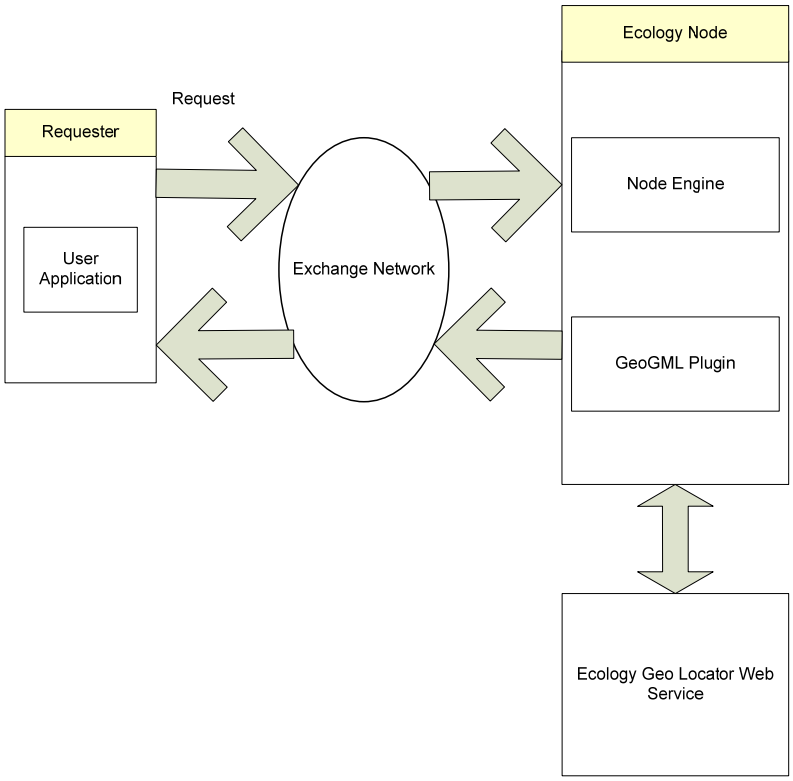
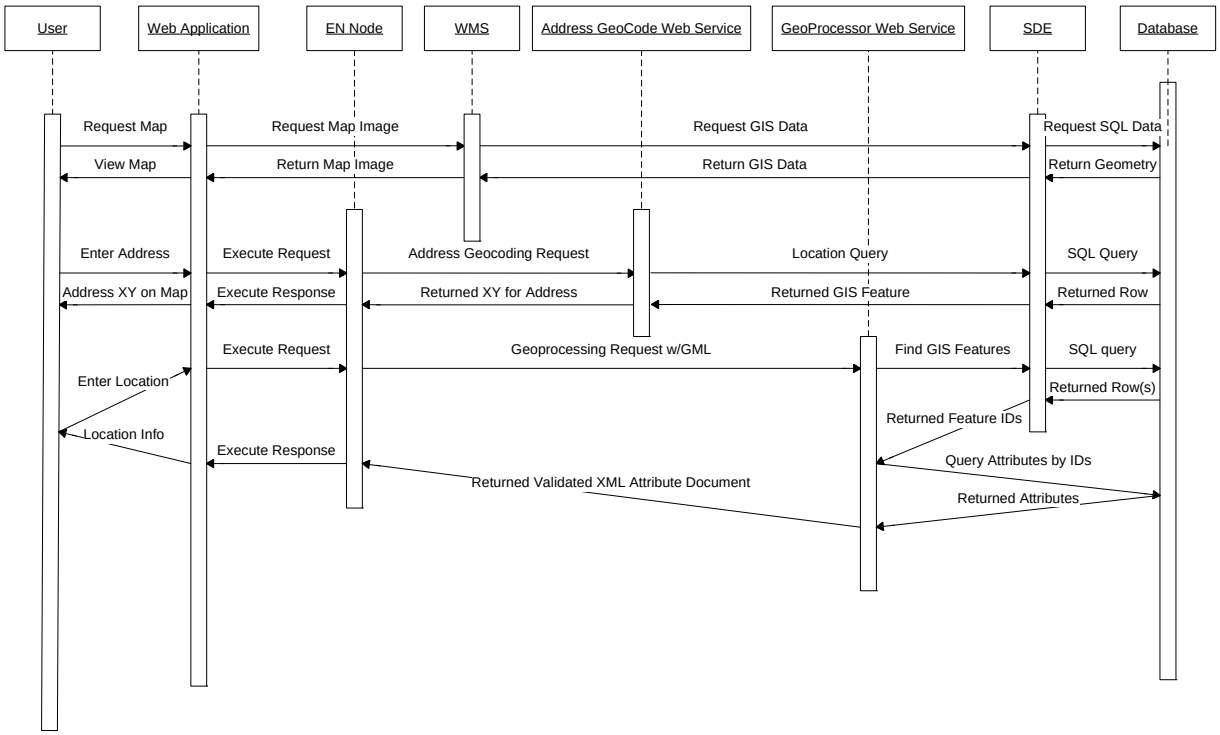


Illustration 1.



Washington Location Finder Sequence Diagram

Exchange Network Compliancy

This exchange was built to comply with all OpenNode2 Exchange Network protocols and processes. It runs using a standard C# .net 3.5Execute plugin on the OpenNOde2.0 .net node. All programming is done in c# and was prototyped using OpenNode2 plugin technology.

The service is available on both the 1.1 and 2.0 endpoints, and requires NAAS authorization prior to use.

GeoGML.GetGMLLayers

a) Exchange Availability

The service runs consistent with the Washington Exchange Network node

> Regular supported hours 7a.m. to 7 p.m. M-F
> All hours outside the 7-7by5 are extended unsupported hours where the node may or may not be available.

b) Naming Convention

GeoGML.GetGMLLayers

c) Data Service Timing/Initiation

On request.

No scheduled use of this data service is expected, although future applications may utilize scheduled requests as appropriate.

d) Payload Format (Schema)

Due to the nature of this flow as well as the number of possible variations of elements in the payload no formal schema has been developed. Further discussion will be provided in the GeoGML Payload section of this document.

e) GeoGML Service Interface

Data Service Type - *Execute*

General Process description: The requesting node or application may invoke this data service using the Execute method; the result size and structure will depend on the content of the GML input. The consumer provides only the name of the flow and the service with a valid NAAS Security Token and the flow will return the current list of layers supported in the service. The data returned will be the layer name and description.

Network service level parameters: A valid NAAS SecurityToken, flow name and service name are required as specified in the Node 2.0 specifications.

Mandatory Parameters: None.

Optional Parameters: None.

Additional Notes:

Figure 1 below illustrates how the parameters might look when input into the OpenNode2.0 Administration tool.

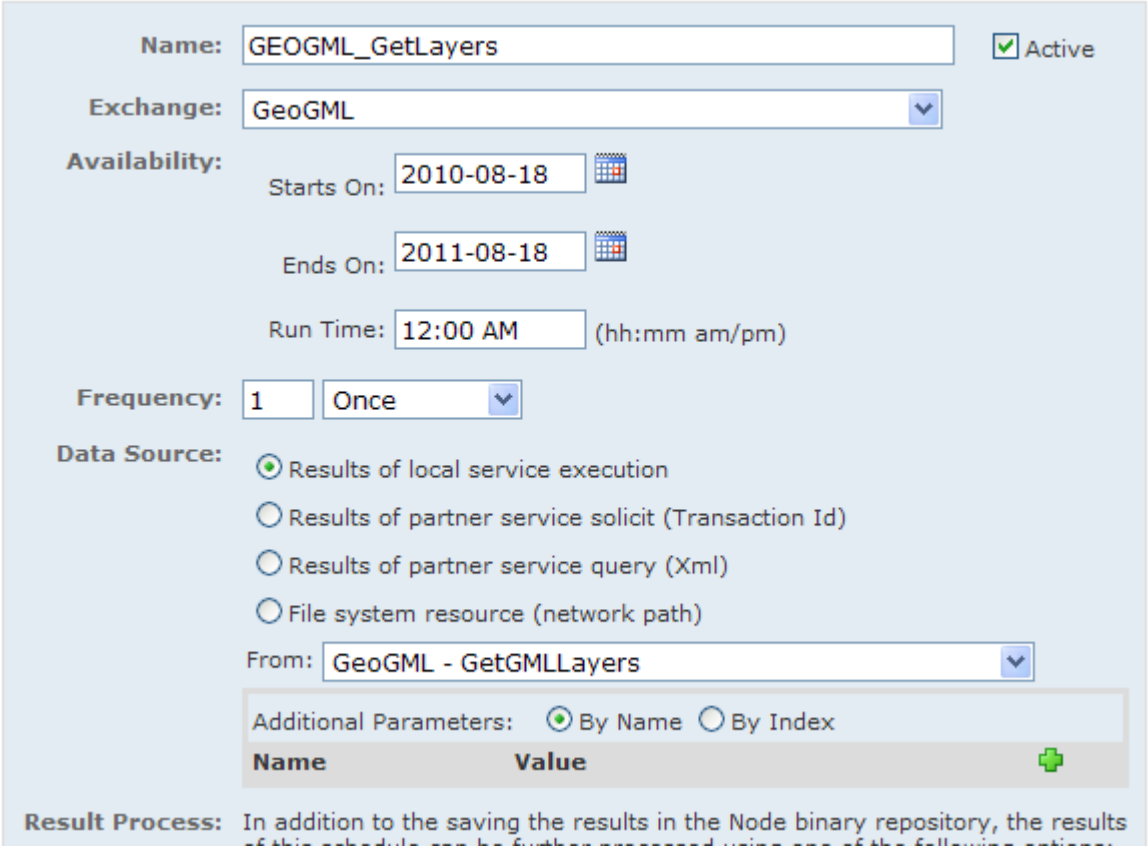


Figure 1

Error Messages: None.

GeoGML.GetIntersectByPoint

a) Exchange Availability

The service runs consistent with the Washington Exchange Network node

> Regular supported hours 7a.m. to 7 p.m. M-F
> All hours outside the 7-7by5 are extended unsupported hours where the node may or may not be available.

b) Naming Convention

GeoGML.GetIntersectByPoint

c) Data Service Timing/Initiation

On request.

No scheduled use of this data service is expected, although future applications may utilize scheduled requests as appropriate.

d) Payload Format (Schema)

Due to the nature of this flow as well as the number of possible variations of elements in the payload no formal schema has been developed. Further discussion will be provided in the GeoGML Payload section of this document.

e) GeoGML Service Interface

Data Service Type - *Execute*

General Process description: The requesting node or application may invoke this data service using the Execute method; the result size and structure will depend on the content of the GML input. The consumer provides only the name of the flow and the service with a valid NAAS Security Token, an X,Y (Lat,Long) pair, an array of layer names, an array of buffer sizes, the Coordinate Reference Code, and a boolean flag that indicates if the user wants the schema returned or not.

The service will determine the detailed information from the indicated layers and return that data and optionally the schema to the consumer.

Network service level parameters: A valid NAAS SecurityToken, flow name and service name are required as specified in the Node 2.0 specifications.

Mandatory Parameters:

1. **X –** A valid latitude which runs within the boundaries of Washington State.

2. **Y -** A valid longitude which runs within the boundaries of Washington State.

3. **CRSCode** The coordinate reference code.

4. **1-n layer name values** A collection of strings where each entry contains that valid name of a layer used in the service. These names are available by calling the GetGMLLayers method of this service.

5. **An array of 1-n buffer values** A collection of strings where each entry contains that numeric value of 0-nnn indicating the areas size around the X,Y pair to consider in the process..

Optional Parameters:

1. **Schema inclusion indicator- IncludeSchema** A string field containing the word "true" if the consumer wants to have the schema included in the results. If the field is missing or contains any other value the schema is not included.

Additional Notes:

Layer Name and Buffer parameters are paired but are separate parameters. To stay with the Node 2.0 paradigm we have named the layer name parameters Layer0, Layer1… LayerN and Buffer0, Buffer1 … BufferN such that Buffer0 is paired with the layer names in Layer0. Figure 2 below illustrates how the parameters might look when input into the OpenNode2.0 Administration tool.

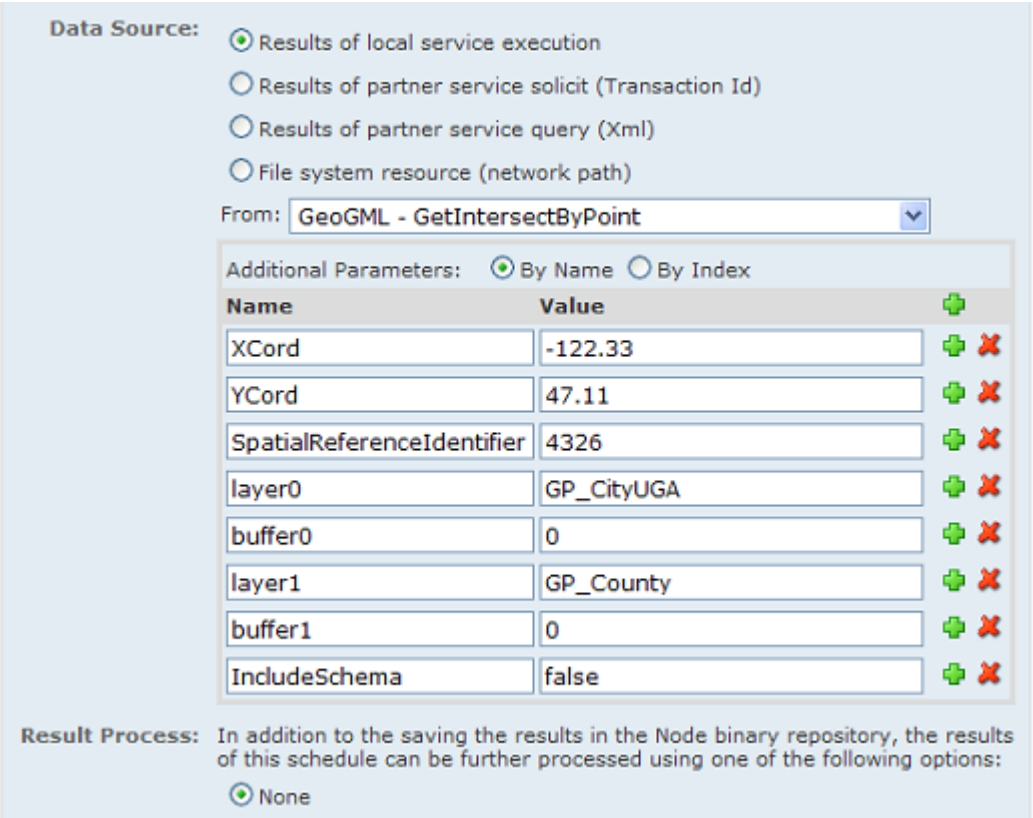


Figure 2

Error Messages:

a. Supplied Service Name is not a valid service for this flow
b. One or more mandatory parameters were missing.
c. Invalid parameter(s) {list of parms} in submitted layer list. System takes only certain permitted layer names.

GeoGML. GetIntersectByGML

a) Exchange Availability

The service runs consistent with the Washington Exchange Network node

> Regular supported hours 7a.m. to 7 p.m. M-F
> All hours outside the 7-7by5 are extended unsupported hours where the node may or may not be available.

b) Naming Convention

GeoGML.GetIntersectByGML

c) Data Service Timing/Initiation

On request.

No scheduled use of this data service is expected, although future applications may utilize scheduled requests as appropriate.

d) Payload Format (Schema)

Due to the nature of this flow as well as the number of possible variations of elements in the payload no formal schema has been developed. Further discussion will be provided in the GeoGML Payload section of this document.

e) GeoGML Service Interface

Data Service Type - *Execute*

General Process description: The requesting node or application may invoke this data service using the Execute method; the result size and structure will depend on the content of the GML input. The consumer provides only the name of the flow and the service with a valid NAAS Security Token, Geospatial information in the form of GML defining the geometry included and requested, and a boolean flag that indicates if the user wants the schema returned or not.

The node service will pass back the resulting XML to the consumer without alteration. The internal web service will perform the following processes:

1. Determine the type of data to return by the GML that is passed in. The service can return point, line, and polygon data depending on the format of the inbound GML.

2. Convert the inbound coordinates to state plane coordinates using the coordinate designation in the GML to convert them.

3. Process the intersect of the inbound point, line or, polygon against the named layers within the proximity of the buffers.

4. The results will be packaged in GML for the user to consume.

5. Optionally the user will receive back the schema of the output.

Network service level parameters: A valid NAAS SecurityToken, flow name and service name are required as specified in the Node 2.0 specifications.

Mandatory Parameters:.

1. **GML –** A structured collection of data elements that conform to the GML standards and include the coordinates, and CRS encoding to use.

2. **An array of 1-n buffer values** A collection of strings where each entry contains that numeric value of 0-nnn indicating the areas size around the GML coordinates to consider in the process..

Optional Parameters:

1. **Schema inclusion indicator- IncludeSchema** A string field containing the word “true” if the consumer wants to have the schema included in the results. If the field is missing or contains any other value the schema is not included.

Additional Notes:

Buffer parameters are paired with the coordinates within the GML but are separate parameters. Figure 3 below illustrates how the parameters might look when input into the OpenNode2.0 Administration tool.

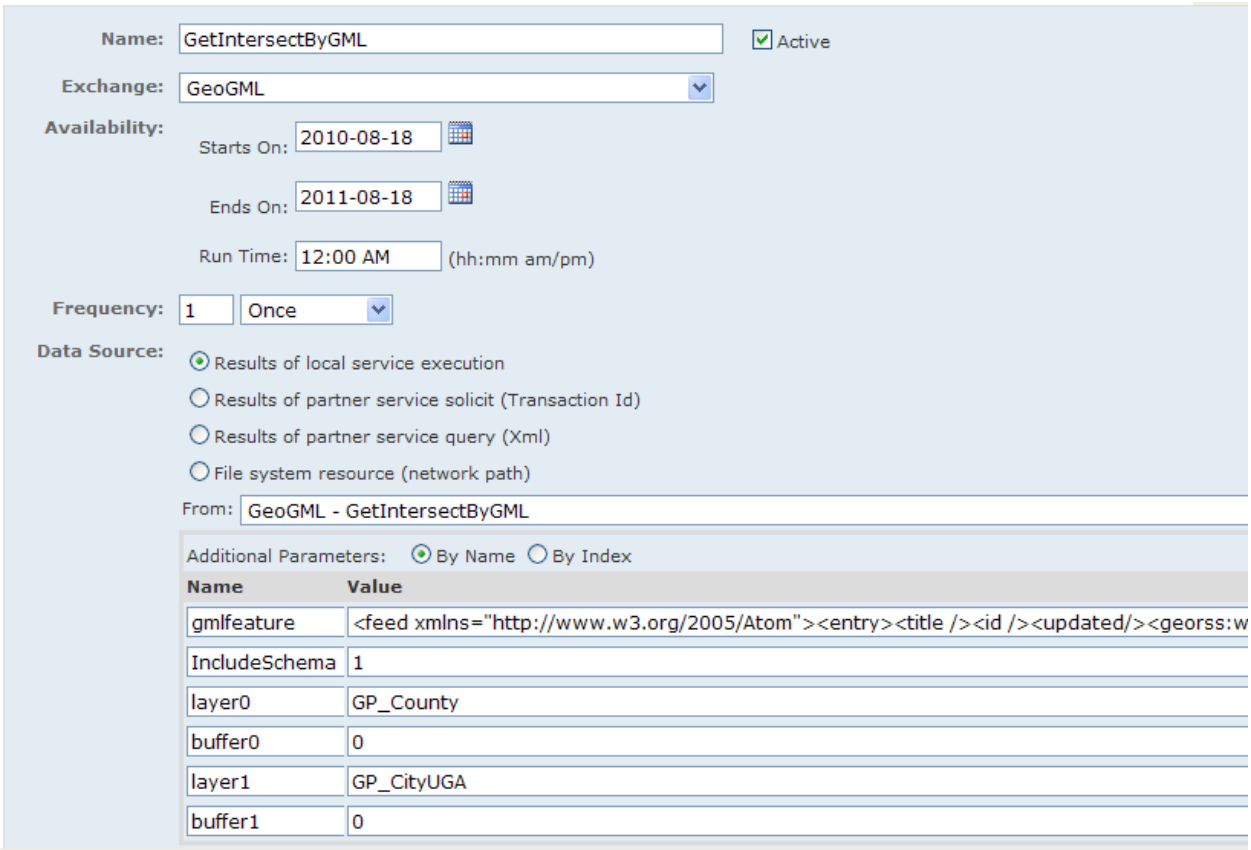


Figure 3

Error Messages:

a. Supplied Service Name is not a valid service for this flow
b. One or more mandatory parameters were missing.
c. Invalid parameter(s) {list of parms} in submitted layer list. System takes only certain permitted layer names.

GeoGML Payload

a) **Description:** The payload will be an approved well-formed Xml that represents the results of the execute request. Further the payload will meet the standards for Xml payloads as stipulated by the EPA and the EN committees and standards.

b) **Exception:** Since the number of requested layers and the order of those layers in the GeoLocator Execute Request can vary greatly the resulting Xml can take any number of variations. Further since the number of available layers can and will change without change to the GeoLocator Execute flow and plugin, the possible alterations to the schema are unlimited and therefore not included in this documentation.

c) **Provision:** To meet the ease-of-use requirements of EN data the GeoLocator Execute includes the **IncludeSchema** parameter which is a Boolean that when set to true provides the dynamic schema to the resulting Xml to the consumer. With the actual schema to the document the consuming user/program can readily traverse the Xml.

Appendix A - List of the CRS Codes used in the services

Geographic Coordinate Reference Systems:

4326 - GCS_WGS_1984

4269 - GCS_North_American_1983

4152 - GCS_North_American_1983_HARN

Projected Coordinate Reference Systems:

32610 - WGS_1984_UTM_Zone_10N

32611 - WGS_1984_UTM_Zone_11N

26910 - NAD_1983_UTM_Zone_10N

26911 - NAD_1983_UTM_Zone_11N

32148 - NAD_1983_StatePlane_Washington_North_FIPS_4601

32149 - NAD_1983_StatePlane_Washington_South_FIPS_4602

2855 - NAD_1983_HARN_StatePlane_Washington_North_FIPS_4601

2856 - NAD_1983_HARN_StatePlane_Washington_South_FIPS_4602

2285 - NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet

2286 - NAD_1983_StatePlane_Washington_South_FIPS_4602_Feet

2926 - NAD_1983_HARN_StatePlane_Washington_North_FIPS_4601_Feet

2927 - NAD_1983_HARN_StatePlane_Washington_South_FIPS_4602_Feet

102100 - WGS_1984_Web_Mercator_Auxiliary_Sphere

102113 - WGS_1984_Web_Mercator