# ArcIMS® 9

## Customizing ArcIMS®—WFS Connector

GIS by ESRI™

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# WFS Connector fundamental operations

The Open Geospatial Consortium (OGC) WFS Implementation Specification allows users to publish feature-level geospatial data to the Web. GML (XML vocabulary for the GIS domain) is used to communicate feature and attribute information to clients. A WFS-enabled client can use this streamed GML as a data source to render a map. From a client perspective, the WFS interface provides a consistent and standardized access interface to data served by different WFS servers, each of which could be working with different data formats and different Internet mapping technologies.

More information on the Web Feature Specification can be found at www.opengeospatial.org. The current adopted specification for WFS is 1.0.0.

This WFS Connector included with the ArcIMS® 9.1 install does not implement the optional transactional operations and is, therefore, a read-only WFS.

The current implementation of the WFS Connector works with the ArcIMS Feature Service. In other words, any ArcIMS feature service can be exposed as a WFS service using the Web-based administration tool included with the WFS Connector install.

# Supported operations

The WFS Connector supports the following operations:

- GetCapabilities—HTTP GET/KVP encoding
- DescribeFeatureType—HTTP GET/KVP encoding
- GetFeature—HTTP GET/KVP and HTTP POST/XML encoding

# WFS GetCapabilities operation

The Open GIS Consortium (OGC) standard WFS implementation requires a GetCapabilities operation to describe the server capabilities. The version attribute of GetCapabilities is optional. Since Version 1.0.0 is currently the only supported version, it is both the highest and the lowest version, which is the result of version negotiation.

## Example: Request a GetCapabilities operation

The HTTP GET method can be used to request a GetCapabilities document.

### HTTP GET request

Assuming a host name of scenario.esri.com and a Map Service named smallworld, an HTTP GET request can be sent as:

```
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?request=getcapab
ilities&service=wfs&version=1.0.0
```

### Response

```
<?xml version="1.0" encoding="UTF-8" ?>

- <WFS_Capabilities xmlns="http://www.opengis.net/wfs"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:ogc="http://www.opengis.net/ogc" xmlns:gml="http://www.opengis.net/gml"
xsi:schemaLocation="http://www.opengis.net/wfs
http://schemas.opengis.net/wfs/1.0.0/WFS-capabilities.xsd" version="1.0.0">

- <Service>

  <Name>ESRI Basic Web Feature Service</Name>

  <Title>ESRI OGC compliant Basic WFS Server</Title>

  <Abstract>This is an OGC compliant MapService. The engine used to serve
this MapService is ArcIMS</Abstract>

  <Keywords>ESRI, ArcIMS Feature MapService</Keywords>
```

```
<OnlineResource>http://scenario.esri.com:80/wfs/com.esri.wfs.Esrimap/smallwor
ld?</OnlineResource>
  <Fees>none</Fees>
  <AccessConstraints>none</AccessConstraints>
  </Service>
- <Capability>
- <Request>
- <GetCapabilities>
- <DCPType>
- <HTTP>
  <Get
onlineResource="http://scenario.esri.com:80/wfs/com.esri.wfs.Esrimap/smallwor
ld?" />
  </HTTP>
  </DCPType>
  </GetCapabilities>
- <DescribeFeatureType>
- <SchemaDescriptionLanguage>
  <XMLSCHEMA />
  </SchemaDescriptionLanguage>
- <DCPType>
- <HTTP>
  <Get
onlineResource="http://scenario.esri.com:80/wfs/com.esri.wfs.Esrimap/smallwor
ld?" />
  </HTTP>
  </DCPType>
  </DescribeFeatureType>
- <GetFeature>
- <ResultFormat>
  <GML2 />
  </ResultFormat>
- <DCPType>
- <HTTP>
  <Get
onlineResource="http://scenario.esri.com:80/wfs/com.esri.wfs.Esrimap/smallwor
ld?" />
```

```
  <Post
onlineResource="http://scenario.esri.com:80/wfs/com.esri.wfs.Esrimap/smallwor
ld" />
  </HTTP>
  </DCPType>
  </GetFeature>
  </Request>
  </Capability>
- <FeatureTypeList>
- <Operations>
  <Query />
  </Operations>
- <FeatureType>
  <Name>Fifteen</Name>
  <Title>Feature point class Fifteen (id=Fifteen)</Title>
  <SRS>EPSG:32615</SRS>
  <LatLongBoundingBox minx="500073.380261901" miny="491314.362198974"
maxx="1050607.34550134" maxy="720624.373576737" />
  </FeatureType>
- <FeatureType>
  <Name>Seven</Name>
  <Title>Feature point class Seven (id=Seven)</Title>
  <SRS>EPSG:32615</SRS>
  <LatLongBoundingBox minx="365040.061148396" miny="472904.401159664"
maxx="695755.330850209" maxy="585455.018554485" />
  </FeatureType>
-…….
….
  </FeatureTypeList>
  </WFS_Capabilities>
```


# WFS DescribeFeatureType operation

The WFS Specification Version 1.0.0 requires a DescribeFeatureType operation to define feature instance encoding on input and feature instance generation on output.

## Example: Request a DescribeFeatureType operation

### HTTP GET request

http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?request=describefeaturetype&service=wfs&version=1.0.0.

### Response


```
<?xml version="1.0" encoding="UTF-8" ?>

- <xsd:schema targetNamespace="http://www.esri.com/esri"
xmlns:cdf="http://www.esri.com/esri"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:gml="http://www.opengis.net/gml" elementFormDefault="qualified"
version="0.1">

  <xsd:import namespace="http://www.opengis.net/gml"
schemaLocation="http://schemas.opengis.net/gml/2.1.2/feature.xsd" />

- <xsd:complexType name="Fifteen_Type">

- <xsd:complexContent>

- <xsd:extension base="gml:AbstractFeatureType">

- <xsd:sequence>

  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />

  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />

  </xsd:sequence>

  </xsd:extension>

  </xsd:complexContent>

  </xsd:complexType>

  <xsd:element name="Fifteen" type="cdf:Fifteen_Type"
substitutionGroup="gml:_Feature" />

- <xsd:complexType name="Seven_Type">

- <xsd:complexContent>

- <xsd:extension base="gml:AbstractFeatureType">

- <xsd:sequence>

  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />

  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />

  </xsd:sequence>

  </xsd:extension>
```

```
  </xsd:complexContent>

  </xsd:complexType>

  <xsd:element name="Seven" type="cdf:Seven_Type"
substitutionGroup="gml:_Feature" />

- <xsd:complexType name="MPolygons_Type">

- <xsd:complexContent>

- <xsd:extension base="gml:AbstractFeatureType">

- <xsd:sequence>

  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />

  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />

  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />

  </xsd:sequence>

  </xsd:extension>

  </xsd:complexContent>

  </xsd:complexType>

  <xsd:element name="MPolygons" type="cdf:MPolygons_Type"
substitutionGroup="gml:_Feature" />

- <xsd:complexType name="MLines_Type">

- <xsd:complexContent>

- <xsd:extension base="gml:AbstractFeatureType">

- <xsd:sequence>

  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />

  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />

  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />

  </xsd:sequence>

  </xsd:extension>

  </xsd:complexContent>

  </xsd:complexType>

  <xsd:element name="MLines" type="cdf:MLines_Type"
substitutionGroup="gml:_Feature" />

- <xsd:complexType name="Other_Type">

- <xsd:complexContent>
```

```
- <xsd:extension base="gml:AbstractFeatureType">
- <xsd:sequence>
  <xsd:element name="STRING1" type="xsd:string" nillable="false"
minOccurs="0" maxOccurs="1" />
  <xsd:element name="STRING2" type="xsd:string" nillable="false"
minOccurs="0" maxOccurs="1" />
  <xsd:element name="INTEGERS" type="xsd:integer" nillable="false"
minOccurs="0" maxOccurs="1" />
  <xsd:element name="DATES" nillable="false" minOccurs="0" maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
  <xsd:element name="Other" type="cdf:Other_Type"
substitutionGroup="gml:_Feature" />
- <xsd:complexType name="Points_Type">
- <xsd:complexContent>
- <xsd:extension base="gml:AbstractFeatureType">
- <xsd:sequence>
  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
  <xsd:element name="Points" type="cdf:Points_Type"
substitutionGroup="gml:_Feature" />
- <xsd:complexType name="Polygons_Type">
- <xsd:complexContent>
- <xsd:extension base="gml:AbstractFeatureType">
```

```
- <xsd:sequence>
  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
  <xsd:element name="Polygons" type="cdf:Polygons_Type"
substitutionGroup="gml:_Feature" />
- <xsd:complexType name="MPoints7_Type">
- <xsd:complexContent>
- <xsd:extension base="gml:AbstractFeatureType">
- <xsd:sequence>
  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
  <xsd:element name="MPoints7" type="cdf:MPoints7_Type"
substitutionGroup="gml:_Feature" />
- <xsd:complexType name="MPoint15_Type">
- <xsd:complexContent>
- <xsd:extension base="gml:AbstractFeatureType">
- <xsd:sequence>
  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
```

```
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
  <xsd:element name="MPoint15" type="cdf:MPoint15_Type"
substitutionGroup="gml:_Feature" />
- <xsd:complexType name="Lines_Type">
- <xsd:complexContent>
- <xsd:extension base="gml:AbstractFeatureType">
- <xsd:sequence>
  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
  <xsd:element name="Lines" type="cdf:Lines_Type"
substitutionGroup="gml:_Feature" />
- <xsd:complexType name="small_cntry02_Type">
- <xsd:complexContent>
- <xsd:extension base="gml:AbstractFeatureType">
- <xsd:sequence>
  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
  <xsd:element name="small_cntry02" type="cdf:small_cntry02_Type"
substitutionGroup="gml:_Feature" />
```

```
- <xsd:complexType name="small_rivers_Type">
- <xsd:complexContent>
- <xsd:extension base="gml:AbstractFeatureType">
- <xsd:sequence>
  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
  <xsd:element name="small_rivers" type="cdf:small_rivers_Type"
substitutionGroup="gml:_Feature" />
- <xsd:complexType name="small_cities_Type">
- <xsd:complexContent>
- <xsd:extension base="gml:AbstractFeatureType">
- <xsd:sequence>
  <xsd:element name="NAME" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="COUNTRY" type="xsd:string" nillable="false"
minOccurs="0" maxOccurs="1" />
  <xsd:element name="POPULATION" type="xsd:integer" nillable="false"
minOccurs="0" maxOccurs="1" />
  <xsd:element name="CAPITAL" type="xsd:string" nillable="false"
minOccurs="0" maxOccurs="1" />
  <xsd:element name="ID" type="xsd:string" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_ID_" type="xsd:integer" nillable="false" minOccurs="0"
maxOccurs="1" />
  <xsd:element name="_SHAPE_" type="gml:GeometryPropertyType"
nillable="false" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  </xsd:extension>
  </xsd:complexContent>
  </xsd:complexType>
```

```
  <xsd:element name="small_cities" type="cdf:small_cities_Type"
substitutionGroup="gml:_Feature" />

  </xsd:schema>
```

# WFS GetFeature operation

A GetFeature operation retrieves features from WFS. The response returned to the client is an XML (GML) document. The XML schema for the operation is listed in detail in the OGC WFS Implementation Specification.

## Example: Request a GetFeature operation

### HTTP GET request

```
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?request=getfeatu
re&typename=small_rivers&service=wfs&version=1.0.0
```

### Response

```
 <?xml version="1.0" encoding="UTF-8" ?>

- <wfs:FeatureCollection xmlns="http://www.esri.com/esri"
xmlns:gml="http://www.opengis.net/gml" xmlns:wfs="http://www.opengis.net/wfs"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.esri.com/esri
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?request=describe
featuretype&service=WFS&version=1.0.0 http://www.opengis.net/wfs
http://schemas.opengis.net/wfs/1.0.0/WFS-basic.xsd">

- <gml:boundedBy>

- <gml:Box srsName="EPSG:32615">

  <gml:coordinates>106072.383058401,107846.020512474
723347.102323297,700349.538602848</gml:coordinates>

  </gml:Box>

  </gml:boundedBy>

- <gml:featureMember>

- <small_rivers fid="small_rivers.1">

  <ID>t0001</ID>

  <_ID_>1</_ID_>

- <_SHAPE_>

- <gml:MultiLineString srsName="EPSG:32615">

- <gml:lineStringMember>

- <gml:LineString srsName="EPSG:32615">
```

```
  <gml:coordinates>117163.857153789,663345.543627852
120522.17837466,663256.871750392 125294.54920337,663073.474760447 …

171872.433940485,689768.409345136 130697.501809463,689984.043483097
106072.383058401,700349.538602848</gml:coordinates>

  </gml:LineString>

- <gml:lineStringMember>

- <gml:LineString srsName="EPSG:32615">

  <gml:coordinates>320454.322529311,686321.113427067
326622.234610157,684324.506440709 362114.877359964,672852.83440477
362352.703564757,669229.144343482 382290.975384359,661631.422866377 …….

701599.130632164,154327.402402557 709840.126661876,144137.257681495
705982.808999907,133414.028966814 694708.629292766,129121.531202471
610687.855198463,107846.020512474</gml:coordinates>

  </gml:LineString>

  </gml:lineStringMember>

  </gml:lineStringMember>

  </gml:MultiLineString>

  </_SHAPE_>

  </small_rivers>

  </gml:featureMember>

  </wfs:FeatureCollection>
```

Note: The WFS GetFeature request returns the projection information in an SRS tag so that the client can use this information during the display. The WFS specification does not provide the user with the option to request the features in a projection other than that specified as a default in the ArcIMS Feature Service.

### Supported Filter operations

The current WFS implementation supports three filter operations as part of the GetFeatures request: BBox, FeatureID, and PropertyNames.

# Using the WFS Connector Administrator

The WFS Connector Administrator handles all WFS administration. These tasks are:

- Logging in to the Administrator
- Setting WFS Connector properties
- Changing the password

- Enabling and disabling WFS services
- Errors and warnings during administration

## Logging in to the Administrator

Before you are allowed access to the Administrator, you must follow these steps.

1. Open a Web browser.
2. Enter the URL for the Administrator, which is accessed through a URL similar to the following example:

   http://<hostname>/<deploy_name>/

   where

   - **<hostname>** is the URL domain name for your site, such as www.esri.com, or a fully qualified machine name
   - **<deploy_name>** is the name you assigned to the Web application when you deployed the WFS Connector. The recommended/default deployment name is wfsconnector.

     Example: `http://scenario.esri.com/wfsconnector`

3. In the page that appears, type your username and password.

   If this is your first time logging in to the Administrator, you are prompted to create a new username and password. You would also confirm your password by typing it again in the third field. This username and password is required for all future sessions.

4. Click Login.

## Setting WFS Connector properties

Click on the Connector Properties link that appears on the top left of the Administrator page to open the WFS Connector Properties page. The WFS Connector Properties page allows you to set up or update the WFS Connector environment. The following properties are set on this page.

### Enable WFS

This property specifies whether the WFS Connector is enabled or disabled. When enabled, WFS requests can be made through the connector. When disabled, all WFS services still exist along with their Capabilities files, but they are inaccessible to WFS requests. The only allowable command is connectorPing, which tests communication with the WFS Connector. An example URL to test a connectorPing is

http://<hostname>/<deploy_name>/com.esri.wfs.Esrimap?CMD=connectorPing

where

- **<hostname>** is the URL domain name for your site, such as www.esri.com, or a fully qualified machine name.
- **<deploy_name>** is the name you assigned to the Web application when you deployed the WFS Connector. The recommended deployment name is wfsconnector.
- **http://<domain_name>/wfsconnector/com.esri.wfs.Esrimap?** is the full URL to access the WFS Connector on an ArcIMS site.
- **CMD=connectorPing** is the parameter to test communication with the WFS Connector.

### ArcIMS Host Machine

Name of the machine in which the ArcIMS Application Server is running. If your site has more than one machine with an Application Server, choose the primary machine.

### ArcIMS Client Port

The port through which the ArcIMS Servlet Connector communicates with the ArcIMS Application Server. By default, the port is 5300. If your site uses more than one port, use the port number that matches the port for the primary host machine.

### Default Service

Sets the default ArcIMS service the WFS Connector recognizes. The WFS Connector can support many services. Nondefault services are accessible by including the service name in the URL.

Example when using default service

```
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap?request=getcapabilities&ser
vice=wfs&version=1.0.0
```

Example when specifying a service name of smallworld in the URL

```
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?request=getcapab
ilities&service=wfs&version=1.0.0
```

### Capabilities Directory

The location in which the WFS Capabilities files are placed. A Capabilities file specifies the contents of a WFS service. Capabilities files are created for each WFS-enabled ArcIMS service.

The directory can be placed anywhere on your network that is visible to the host machine. It does not need to be in a location accessible to the Web server. If the directory name you choose does not exist, a new directory is created.

---

**Note:** If a new directory is created when setting the Capabilities directory, this directory can only be one level down from an existing directory. For example, if c:\wfs already exists, you can create a new directory, c:\wfs\capabilities. However, you cannot create a new directory named c:\wfs\capabilities\new.

---

### Path To Connector

This specifies the path to the deployed WFS connector. An example path would be http://scenario.esri.com/wfsconnector.

### Namespace Name

Provide a namespace prefix that points to the namespace URI.

### Namespace URI

This specifies the target namespace for the element type definitions (schemas).

### Debug

Specifies whether logging is enabled. The default is false.

### Error Log

Errors and messages can be logged in one of two files:

- Use "file" if you want error information to be logged to WFSEsrimap.log. This log file is a text file located in the Capabilities Directory.
- Use "servlet" if you want error information to be logged to the servlet engine's log file.

If the Debug property is false, this property is ignored, and there is no logging. The default value is file.

### Submitting the parameters

When you have filled out all the parameters on the page, click Submit. The information is registered automatically by the WFS Connector.

**A note about the WFSEsrimap_prop property file:** Once you have submitted the parameters in Administrator, the WFSEsrimap_prop property file is updated. This file is located in the expanded WAR file's WEB-INF/classes directory. The location of the expanded WAR file directory varies, depending on the servlet engine you are using. However, the structure of the expanded WAR file is always the same.

```
<Application Name>
         |__WEB_INF
            |__classes
               |__WFSEsrimap_prop
```

where

**<Application Name>** is the name of your application when you deployed the WAR file. The recommended name is wfsconnector.

You should not edit WFSEsrimap_prop in a text file. Instead, you should use the Administrator. If you do edit WFSEsrimap_prop, you must manually restart your servlet engine for the changes to take effect.

---

Note: In some applications, it may be unnecessary to restart the Web application after making changes to the properties using the administrator, but there can be situations where the servlet application needs to be restarted. If you do not observe your changes taking effect after making changes to the administrator, it would be advisable to restart the servlet application. Refer to the documentation on starting/restarting a servlet application specific to your particular servlet engine.

---

## Changing the password

You should occasionally change your password to the WFS Connector Administrator. To do this:

1. From the WFS Connector Properties page, click the Change Password link.
2. In the page that appears, type your username and new password. You must confirm the password by typing it again.
3. Click Login.

## Enabling and disabling WFS services

After you have logged in and set properties for the WFS Connector, you will see the main Services page. This page lists all ArcIMS and ArcMap™ Image Services available for your server. With the current version, only ArcIMS feature services can be enabled as WFS services.

### Service column

This column lists all ArcIMS Image, ArcIMS Feature, and ArcMap Image Services available on the server.

### WFS-enabled column

To enable a service for WFS, click Enable WFS. A check mark appears next to the link. When you enable a service, a set of Capabilities files for the service are generated and placed in the Capabilities directory.

A client can send the following WFS requests to the service: GetCapabilities, DescribeFeatureType, and GetFeature.

To disable a WFS service, click Disable WFS. An X appears next to the link. When you disable a service, the Capabilities files for the service are deleted from the Capabilities directory.

**Caution:** Any edits you may have made to a Capabilities file will be lost when you disable the WFS service.

When the ArcIMS Monitor or Application Server is not running, you may see some unexpected behavior when enabling or disabling services. Services can be disabled as usual, and the Capabilities files are deleted. When you try to enable a service, you will get the following error message:

```
The service could not be enabled for WFS. There was a problem creating one or
more capabilities file.
```

When you see this error, check that the ArcIMS Monitor and Application Server are running.

### Capabilities column

- When you click Download, you can view a copy of the Capabilities file. Do not edit this file since it is only a temporary copy.
- When you click Update, the Capabilities files are updated. Do this if you change information in the ArcIMS service.

**Caution:** If you make edits in a Capabilities file and click Update, a new file is generated and overwrites the file you edited.

### Navigation links

- To return to the WFS Connector Properties page, click Connector Properties.
- To update the services list, click Update Services List. Update the list whenever you add or delete ArcIMS services. Some notes:
  - If an ArcIMS service is stopped or deleted, the Capabilities files for that service are not deleted. However, if you update the services list, the service is no longer included in the list. If you restart or re-create the service, the Capabilities files become accessible again. If you have modified the ArcIMS service in any way, be sure to update the Capabilities files.
  - If the ArcIMS Application Server is not running, you will see the following error:

    ```
    ERR3002: An error occurred communicating with the ArcIMS
    Application Server. The service list could not be generated.
    ```

    When you restart the Application Server and update the services list, the list will return as before. No Capabilities files are deleted.

## Errors and warnings during administration

If a problem arises during administration, you will receive an error or warning message. An error message indicates the process was unsuccessful. A warning message indicates that the process was successful, but the results may be incorrect.

The following table lists some common error and warning messages when using the Administrator.

| Problem | Error message |
|---|---|
| ERR3002 | An error occurred communicating with the ArcIMS Application Server. The Service List could not be generated.<br><br>Check if the Application Server is running. If not, restart it. After restarting, you may need to click Update Service List to see the list of services. |
| ERR3006 | One or more capabilities files for this service could not be deleted.<br><br>Check if the files are read-only or are being used by another application such as a text editor. |

| | |
|---|---|
| ERR3007 | The directory containing the capability files for this service could not be deleted.<br><br>Check if the directory has permission to be deleted, is not being shared, or is locked by another process. |
| ERR3009 | The service could not be enabled for WFS. There was a problem creating one or more capabilities files.<br><br>Check if the ArcIMS Monitor and Application Server are running. If they are, check if the ArcIMS service is running. |

## Testing

WFS service provides three interfaces: GetCapabilities, DescribeFeatureType, and GetFeatures.

**GetCapabilities:** Open GIS Consortium standard WFS implementation requires a GetCapabilities operation to describe the server capabilities.

**DescribeFeatureType:** The WFS Specification Version 1.0.0 requires a DescribeFeatureType operation to define feature instance encoding on input and feature instance generation on output.

**GetFeatures:** A GetFeature operation retrieves features from WFS. The response returned to the client is an XML (GML) document.

The following paragraphs provide instructions on testing the response from a HTTP GET request against a WFS service supporting these three interfaces.

### Browser-based client tests

WFS service provides three interfaces: GetCapabilities, DescribeFeatureType, and GetFeatures. You can test the three types of requests by typing the appropriate strings, which are detailed later in this section, in the browser URL.

In the example below, a Web feature service, smallworld, is hosted on an ArcIMS Server. Your string would look similar, but you would use your machine name, port number, and the name of your service in your tests.

For example, a GetCapabilities request might look like

```
http://<machine_name>:8080/wfs/com.esri.wfs.Esrimap/<service_name>?request=ge
tcapabilities&service=WFS&version=1.0.0
```

### Testing GetCapabilities

```
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?request=getcapab
ilities&service=WFS&version=1.0.0
```

### Testing DescribeFeatureType

```
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?request=describe
featuretype&typename=fifteen&service=WFS&version=1.0.0
```

Note the typename=fifteen in the get request string. Fifteen refers to a particular feature in this example, which can be obtained by parsing/looking at the <name> tag under the <featuretype> tag of the GetCapabilities response.

### Testing GetFeatures

```
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?request=getfeatu
re&typename=fifteen&service=WFS&version=1.0.0
```

### Testing supported filter operations

This implementation of the WFS Connector supports the following three filter operations: BBox, PropertyName, and FeatureID.

- **BBOX, PropertyName examples**

  ***Using a GET request***

  ```
  http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?servi
  ce=WFS&version=1.0.0&BBOX=500575,500000,500600,500100&typename=cgf
  :MPolygons&request=GetFeature
  ```

  ***Using a POST request***

  ```
  <?xml version="1.0" encoding="iso-8859-1"?>
  <wfs:GetFeature outputFormat="GML2"
  xmlns="http://www.esri.com/esrins"
  xmlns:wfs="http://www.opengis.net/wfs"
  xmlns:ogc="http://www.opengis.net/ogc" >
  <wfs:Query typeName="cities-2">
  <ogc:PropertyName>_ID_</ogc:PropertyName>
  <ogc:PropertyName>_SHAPE_</ogc:PropertyName>
  <ogc:Filter>
  <ogc:BBOX>
  <ogc:PropertyName>
  _SHAPE_
  </ogc:PropertyName>
  <gml:Box srsName="EPSG:4326:">
  <gml:coordinates>-135,60 -52,68</gml:coordinates>
  </gml:Box>
  </ogc:BBOX>
  ```

```
</ogc:Filter>
</wfs:Query></wfs:GetFeature>
```

- **FeatureIDs, PropertyNames examples**

  ***Using a GET request***

```
http://scenario.esri.com/wfs/com.esri.wfs.Esrimap/smallworld?servi
ce=WFS&version=1.0.0&request=GetFeature&featureid=small_cities.1,s
mall_cities.4
```

  ***Using a POST request***

```
<?xml version="1.0" encoding="iso-8859-1"?>
<wfs:GetFeature outputFormat="GML2"
xmlns="http://www.esri.com/esrins"
xmlns:wfs="http://www.opengis.net/wfs"
xmlns:ogc="http://www.opengis.net/ogc" maxFeatures="2">
<wfs:Query typeName="cities-2">
<ogc:PropertyName>_ID_</ogc:PropertyName>
<ogc:PropertyName>_SHAPE_</ogc:PropertyName>
<ogc:Filter>
<ogc:FeatureId fid="6"/>
<ogc:FeatureId fid="9"/>
</ogc:Filter>
</wfs:Query></wfs:GetFeature>
```

# Data Interoperability extension for ArcGIS

ESRI provides WFS client functionality as part of the Data Interoperability extension for ArcGIS 9.X.

To access the Data Interoperability extension for ArcGIS:

- Open ArcCatalog.
- You will see in the directory tree an Interoperability Connections branch.
- Open it and click Add interoperability connection.
- Choose the Web feature service format and dataset type in the link to the Capabilities file.
- You should then click OK and be able to see the data under the Preview tab in ArcCatalog.
- This creates a permanent link in ArcCatalog that you can revisit to access this service.

# Known limitations

This WFS implementation only works with ArcIMS feature services. ArcIMS image and ArcMap image services cannot be enabled as WFS services.

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