Working with published data using a web feature service (WFS) client

A web feature service (WFS) can be used in any client that supports WFS 1.1 and the Simple Features profile of GML including web browsers. The following sections will show you how to access WFS services through a web browser.

Connecting to your WFS service through a web browser

A Web browser is one of the simplest clients of a WFS service. You can request information through HTTP and the responses or exceptions are returned through the browser.
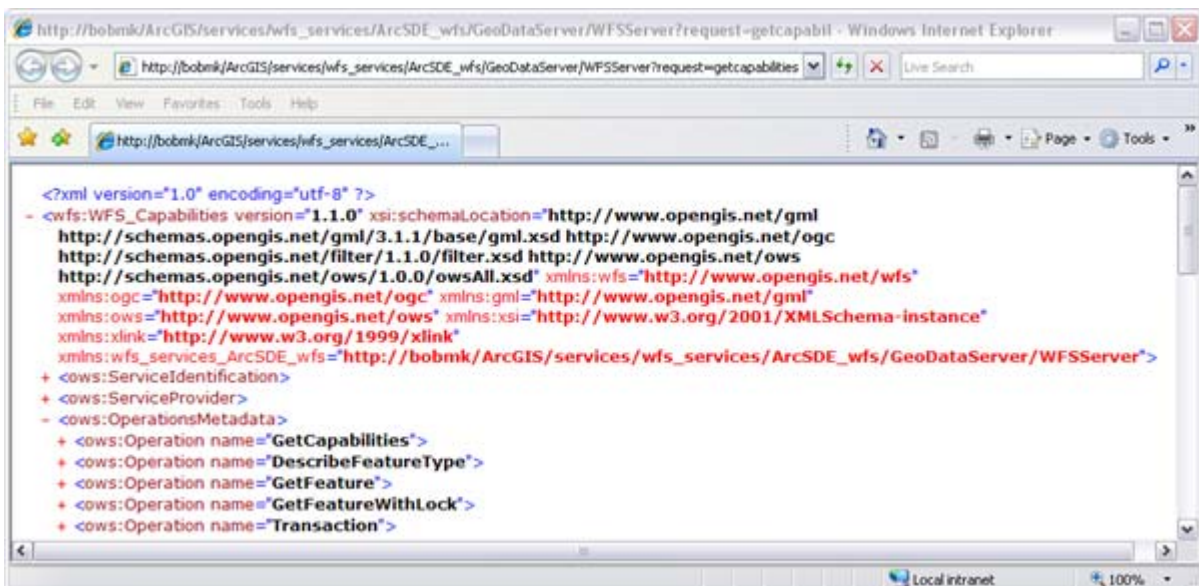
To connect to your service you need to know the WFS URL which can be located in the service's Properties under the Capabilities tab in ArcGIS Server Manager or ArcCatalog. Once you have the URL you can use OGC standard operations to request information about the service through HTTP. Some examples of operations that you can use to request information include:

GetCapabilities

This request will return all feature types and functionality available through the service in GML format. To use the GetCapabilities operation in a web browser copy and paste the WFS URL into the address bar and add "?request=getCapabilities" to the end, as shown in the example and screen shot below.

URL: http://webfeatureservice.brighton-hove.gov.uk/arcgis/services/Community/CityCamp/MapServer/WFSServer?request=getcapabilities

The following graphic is an example of functionality returned by the GetCapabilities operation:

```xml
- <ows:OperationsMetadata>
    + <ows:Operation name="GetCapabilities">
    + <ows:Operation name="DescribeFeatureType">
    + <ows:Operation name="GetFeature">
    + <ows:Operation name="GetFeatureWithLock">
    + <ows:Operation name="Transaction">
    - <ows:ExtendedCapabilities>
        - <ows:Constraint name="serviceAxisOrderForSwappableSRS">
            <ows:Value>latitude,longitude</ows:Value>
        </ows:Constraint>
    </ows:ExtendedCapabilities>
  </ows:OperationsMetadata>
```

> List of functionality available through the WFS service

> Includes the axis order so that you know what axis order to expect in the responses

GetCapabilities also returns a list of all available feature classes and tables:

> Feature class called Province

> The spatial referencing system (SRS) and output format of the feature class are listed in the GetCapabilities results

```xml
- <wfs:FeatureTypeList>
  - <wfs:FeatureType>
      <wfs:Name>wfs_services_ArcSDE_wfs:province</wfs:Name>
      <wfs:Title>province</wfs:Title>
      <wfs:DefaultSRS>urn:x-ogc:def:crs:EPSG:6.9:4326</wfs:DefaultSRS>
      <wfs:OtherSRS>urn:x-ogc:def:crs:EPSG:6.9:4326</wfs:OtherSRS>
    - <wfs:OutputFormats>
        <wfs:Format>text/xml; subType=gml/3.1.1/profiles/gmlsf/1.0.0/0</wfs:Format>
      </wfs:OutputFormats>
    - <ows:WGS84BoundingBox>
        <ows:LowerCorner>-141.003005981 41.913318634</ows:LowerCorner>
        <ows:UpperCorner>-52.620281219 83.108322144</ows:UpperCorner>
      </ows:WGS84BoundingBox>
  </wfs:FeatureType>
  - <wfs:FeatureType>
      <wfs:Name>wfs_services_ArcSDE_wfs:cities</wfs:Name>
      <wfs:Title>cities</wfs:Title>
      <wfs:DefaultSRS>urn:x-ogc:def:crs:EPSG:6.9:4326</wfs:DefaultSRS>
      <wfs:OtherSRS>urn:x-ogc:def:crs:EPSG:6.9:4326</wfs:OtherSRS>
    - <wfs:OutputFormats>
        <wfs:Format>text/xml; subType=gml/3.1.1/profiles/gmlsf/1.0.0/0</wfs:Format>
      </wfs:OutputFormats>
    - <ows:WGS84BoundingBox>
        <ows:LowerCorner>-135.159896851 43.72077179</ows:LowerCorner>
        <ows:UpperCorner>-52.684871674 68.269996643</ows:UpperCorner>
      </ows:WGS84BoundingBox>
  </wfs:FeatureType>
</wfs:FeatureTypeList>
```

> It also includes the bounding coordinates of the feature class

> A feature class called Cities and all of its properties

DescribeFeatureType

This request describes the field information about one or more features in the WFS service. This includes the field names, field types, allowed minimum and maximum field values and any other constraints set on a field of the feature classes or tables.
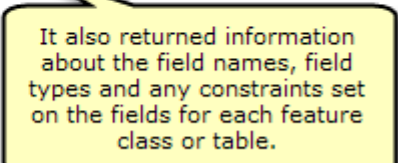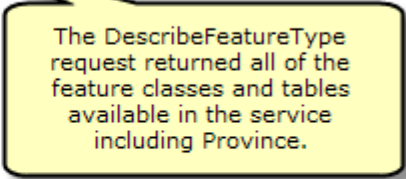
To use the DescribeFeatureType operation in a web browser copy and paste the WFS URL into the address bar and add "?SERVICE=WFS&VERSION=1.1.0&REQUEST=DescribeFeatureType&VERSION=1.1.0" to the end of the URL. This will return all of the field information about each of the feature types and tables available in the feature service, as seen in the screen shot below.

URL example:

http://webfeatureservice.brighton-hove.gov.uk/arcgis/services/Community/CityCamp/MapServer/WFSServer?SERVICE=WFS&VERSION=1.1.0&REQUEST=DescribeFeatureType&VERSION=1.1.0

```xml
<xs:element name="province" type="wfs_services_ArcSDE_wfs:provinceType"
  substitutionGroup="gml:_Feature" />
<xs:complexType name="provinceType">
- <xs:complexContent>
  - <xs:extension base="gml:AbstractFeatureType">
    - <xs:sequence>
        <xs:element name="OBJECTID" type="xs:int" />
      - <xs:element name="NAME" minOccurs="0">
        - <xs:simpleType>
          - <xs:restriction base="xs:string">
              <xs:maxLength value="25" />
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
        <xs:element name="POP91_SQMI" minOccurs="0" type="xs:double" />
        <xs:element name="SHAPE" minOccurs="0" type="gml:MultiSurfacePropertyType" />
        <xs:element name="SHAPE.AREA" type="xs:double" />
        <xs:element name="SHAPE.LEN" type="xs:double" />
    </xs:sequence>
  </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

The DescribeFeatureType request returned all of the feature classes and tables available in the service including Province.

It also returned information about the field names, field types and any constraints set on the fields for each feature class or table.

Adding filters

You can also specify a single feature class or table that you want the field information for by appending the following request to the end of the URL with the name of the feature type or table.
"?SERVICE=WFS&VERSION=1.1.0&REQUEST=DescribeFeatureType&TypeName=[enter feature type here]&VERSION=1.1.0"

In the example below the DescribeFeatureType request is used to identify the field information for the feature type called cities.

URL example:

http://bobmk/arcgis/services/wfs_services/ArcSDE_wfs/GeoDataServer/WFSServer?SERVICE=WFS&VERSION=1.1.0&REQUEST=DescribeFeatureType&TypeName=cities&VERSION=1.1.0

GetFeature

This request returns information about specific feature types available through the WFS service. Additionally, filters can be used to refine the information that is returned. For more information about the different filters available with WFS services see WFS Services.

To use the GetFeature operation in a web browser copy and paste the WFS URL into the address bar and add "?request=getFeature&typename=[enter feature type here]" to the end of the URL. This will return all of the attribute and geometry information about each feature or row in the feature type.

URL example:

http://webfeatureservice.brighton-hove.gov.uk/arcgis/services/Community/CityCamp/MapServer/WFSServer?request=getfeature&typename=cities

```
<gml:featureMember>
- <wfs_services_ArcSDE_wfs:cities gml:id="F293__1">
    <wfs_services_ArcSDE_wfs:OBJECTID>1</wfs_services_ArcSDE_wfs:OBJECTID>
    <wfs_services_ArcSDE_wfs:NAME>Vancouver</wfs_services_ArcSDE_wfs:NAME>
    <wfs_services_ArcSDE_wfs:CAPITAL>N</wfs_services_ArcSDE_wfs:CAPITAL>
    <wfs_services_ArcSDE_wfs:PROV_NAME>British Columbia</wfs_services_ArcSDE_wfs:PROV_NAME>
    <wfs_services_ArcSDE_wfs:POPULATION>1380729</wfs_services_ArcSDE_wfs:POPULATION>
  - <wfs_services_ArcSDE_wfs:SHAPE>
    - <gml:Point>
        <gml:pos>49.159999847 -123.069999695</gml:pos>
      </gml:Point>
    </wfs_services_ArcSDE_wfs:SHAPE>
  </wfs_services_ArcSDE_wfs:cities>
</gml:featureMember>
```

All of the features in the Cities feature class are listed
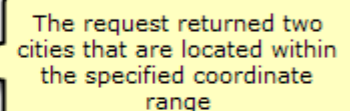
It also lists all of the field names and the attributes for each feature

Adding filters

You can also add filters in the request to refine the results that are returned. For example you can request all of the cities that are within a specified coordinate range. In the example below two cities are located within a specified coordinate range.

URL Example:

http://bobmk/arcgis/services/wfs_services/ArcSDE_wfs/GeoDataServer/WFSServer?request=getfeature&typename=cities&BBOX=46.90,-76.21,42.12,-72.88

```
<gml:featureMember>
- <wfs_services_ArcSDE_wfs:cities gml:id="F293__6">
    <wfs_services_ArcSDE_wfs:OBJECTID>6</wfs_services_ArcSDE_wfs:OBJECTID>
    <wfs_services_ArcSDE_wfs:NAME>Ottawa</wfs_services_ArcSDE_wfs:NAME>
    <wfs_services_ArcSDE_wfs:CAPITAL>C</wfs_services_ArcSDE_wfs:CAPITAL>
    <wfs_services_ArcSDE_wfs:PROV_NAME>Ontario</wfs_services_ArcSDE_wfs:PROV_NAME>
    <wfs_services_ArcSDE_wfs:POPULATION>819263</wfs_services_ArcSDE_wfs:POPULATION>
  - <wfs_services_ArcSDE_wfs:SHAPE>
    - <gml:Point>
        <gml:pos>45.374221802 -75.650749207</gml:pos>
      </gml:Point>
    </wfs_services_ArcSDE_wfs:SHAPE>
  </wfs_services_ArcSDE_wfs:cities>
</gml:featureMember>
<gml:featureMember>
- <wfs_services_ArcSDE_wfs:cities gml:id="F293__7">
    <wfs_services_ArcSDE_wfs:OBJECTID>7</wfs_services_ArcSDE_wfs:OBJECTID>
    <wfs_services_ArcSDE_wfs:NAME>Montreal</wfs_services_ArcSDE_wfs:NAME>
    <wfs_services_ArcSDE_wfs:CAPITAL>N</wfs_services_ArcSDE_wfs:CAPITAL>
    <wfs_services_ArcSDE_wfs:PROV_NAME>Quebec</wfs_services_ArcSDE_wfs:PROV_NAME>
    <wfs_services_ArcSDE_wfs:POPULATION>2921357</wfs_services_ArcSDE_wfs:POPULATION>
  - <wfs_services_ArcSDE_wfs:SHAPE>
    - <gml:Point>
        <gml:pos>45.54101944 -73.653526306</gml:pos>
      </gml:Point>
    </wfs_services_ArcSDE_wfs:SHAPE>
  </wfs_services_ArcSDE_wfs:cities>
</gml:featureMember>
```

The request returned two cities that are located within the specified coordinate range