Web Feature Service 2.0

Standardised web service interface
Provides access to geographic features
Provides transactions on geographic features
Independent of the underlying data store

Filter Encoding (FES)

Encoding of queries to a data store with support for spatial and temporal characteristics
Standardised encodings in XML and KVP (key-value pairs)
Default query mechanism of the Web Feature Service (and other OGC Web Service standards)

Example FES request

```xml
<wfs:GetFeature version="2.0.0" outputFormat="application/gml+xml;version=3.2"
xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:CP="urn:x-inspire:specification:gnacs:CadastralParcels:3.0">
    <gml:Envelope srsName="urn:fes:def:crs:EPSG::25832">
        <gml:lowerCorner>470055 5834487</gml:lowerCorner>
        <gml:upperCorner>471031 5835486</gml:upperCorner>
    </gml:Envelope>
    <fes:PropertyName>CP:geometry</fes:PropertyName>
    <fes:Filter>
        <fes:GTEquals expr="app:period" value="2005-05-20 20:45:00Z"/>
        <fes:TContains expr="ti1" value="2005-05-20 20:45:00Z"/>
    </fes:Filter>
</wfs:GetFeature>
```

Key OGC Web Service standards to access geographic data

History and status of WFS standard

Dependency on GML

- WFS and FES “canonically” require support for GML 3.2
- WFS and FES schemas, however, are designed to be GML agnostic by using <any> elements instead of GML elements
  - The idea is that changes in GML do not require changes to the WFS and FES schemas
  - Previous and future version of GML may be used

Feature versioning

The state of each feature may be represented in a response:
- retired – feature is no longer valid
- superseded – feature version has been superseded by a newer version
- valid – this is the current version of the feature
- ... server-specific versioned state

Queries may request specific versions of a feature:
- first, latest, next, previous, all by date

Temporal Operators in queries

Temporal operators have been added in Filter Encoding
- After, Before, Begins, BegunBy, TContains, During, EndedBy, Ends, TEnds, Meets, MetBy, TIntersects, OverlappedBy, overlapped, intersects

Example:
- <fes:Filter>
  - <fes:TContains />
  - <fes:ValueReference name="app:period" value="2005-05-20 20:45:00Z"/>
  - <fes:TContains expr="ti1" value="2005-05-20 20:45:00Z"/>
- </fes:Filter>

WFS issues

Map-based desktop GIS software does not interact well with the WFS interface
- WFS will in general be used to select and download relevant data and to use and process the data locally
- WFS sometimes perceived as offering low performance
- WFS works well as a web interface to spatial databases; its performance will mainly depend on the performance of the underlying spatial database and the WFS implementation

Key changes with version 2.0

Improve clarity of text and implementation requirements
- Clarify conformance levels
- Make it simpler to implement and use WFS
- New capabilities requested by user communities have been added
- Remove dependencies on specific versions of GML

Simple WFS

Support for Stored Queries
- At least GetFeatureByld, returns a single feature
- Support for additional stored queries optional

No support for Filter Encoding required

Stored Queries

Stored queries = named, parameterised queries stored in the WFS
- No complex query syntax involved
- Advantages:
  - Simplification for the user / client
  - Greater control for the data provider

A simple example

XML:
```
<wfs:GetFeature version="2.0.0" outputFormat="application/gml+xml;version=3.2"
xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:CP="urn:x-inspire:specification:gnacs:CadastralParcels:3.0">
    <gml:Envelope srsName="urn:fes:def:crs:EPSG::25832">
        <gml:lowerCorner>470055 5834487</gml:lowerCorner>
        <gml:upperCorner>471031 5835486</gml:upperCorner>
    </gml:Envelope>
    <fes:PropertyName>CP:geometry</fes:PropertyName>
    <fes:Filter>
        <fes:GTEquals expr="app:period" value="2005-05-20 20:45:00Z"/>
        <fes:TContains expr="ti1" value="2005-05-20 20:45:00Z"/>
    </fes:Filter>
</wfs:GetFeature>
```

KVP:
```
http://www.intractive-instruments.de/services/wfs.eia/?
SERVICE=WFS&
VERSION=2.0.0&
OUTPUTFORMAT=application/gml+xml;version=3.2&
REQUEST=GetFeature&
STOREDQUERY=on&
http://www.intractive-instruments.de/query/parcelByOwner&
FULLNAME= Clemens Portele&
```

Stored Query: GetFeatureByld

```
http://www.intractive-instruments.de/services/wfs.eia/?
SERVICE=WFS&
VERSION=2.0.0&
OUTPUTFORMAT=application/gml+xml;version=3.2&
REQUEST=GetFeature&
STOREDQUERY=on&
http://www.intractive-instruments.de/query/CanadaParcel&
FULLNAME= Clemens Portele&
```

returns the feature with the requested ID in a GML 3.2 representation:
```
<CP:CadastralParcel gml:id="/CadastreParcel:DE_A0000000003A5">
```

Adoption by Communities

INSPIRE (Infrastructure for Spatial Information in the European Community)
INSPIRE Download Service Technical Guidance document based on WFS 2.0
Based on Basic WFS conformance class
GeoML / OneGeology
Interest in WFS 2.0, in particular Stored Queries
Update will depend on the availability of compliant server and client implementations
- Significantly fewer and no longer valid
- In particular Stored Queries should address some of the concerns r
- WFS sometimes perceived as offering low performance
- Feature versioning

Esri Geology Pilot (August 2012)

geodatabase template implementation following the One Geology and INSPIRE information model
Content Delivery on the Web via multiple interfaces
WMS, WFS, REST Feature service and Map service: