

# WPS – WEB PROCESSING SERVICE

Hofbauer Stefan  
Semantic Web Services, SS2009

# WPS - Overview



- ❑ Developed by the Open Geospatial Consortium
- ❑ First released to public in 2005 as version 0.4.0
- ❑ Version 1.0.0 available since 2007

# What is it ?



- “WPS defines a standardized interface that facilitates the publishing of geospatial processes, and the discovery of and binding to those processes by clients.”
- Process = “any algorithm, calculation or model that operates on spatially referenced data”
- Publishing = “making available machine-readable binding information as well as human-readable metadata that allows service discovery and use “

# What can it do ?



- ❑ Make GIS calculations available in a standardized way
- ❑ Describe calculations (including inputs and outputs)
- ❑ Trigger execution of calculations as a Web Service
- ❑ Allow simultaneous exposure of processes via GET, POST and SOAP for maximum client flexibility
- ❑ Use any kind of data (designed for spatially referenced kinds)
- ❑ Publish, find and bind to processes in a standardized and interoperable way

# Technical Details



- Theoretically platform neutral, but only specified for HTTP so far
- 3 Operations:
  - ▣ GetCapabilities: returns service-level metadata
  - ▣ DescribeProcess: returns description of process + input/output
  - ▣ Execute : returns output

# Properties


---

- Inputs: web-accessible URLs or embedded in request
- Outputs: web-accessible URLs or embedded in response
- For single output WPS can return it directly (e.g. GIF)
- Multiple input and output formats
- Supports long-running processes
- Supports SOAP and WSDL

# Example WPS description

```
<ows:Identifier>
  org.n52.wps.server.algorithm.simplify.DouglasPeuckerAlgorithm
</ows:Identifier>
<ows:Title>
  douglasPeucker algorithm
</ows:Title>
<ows:Abstract>
  Uses JTS implementation. Does not support topological awareness
</ows:Abstract>
<ows:Metadata xlink:title="spatial"/>
<ows:Metadata xlink:title="geometry"/>
<ows:Metadata xlink:title="douglas peucker"/>
<ows:Metadata xlink:title="GML"/>
```

# Example WPS description



```
<DataInputs>
  <Input maxOccurs="1" minOccurs="1">
    <ows:Identifier>TOLERANCE</ows:Identifier>
    <ows:Title>Tolerance Value for DP Alg</ows:Title>
    <ows:Abstract/>
    <LiteralData>
      <ows:DataType ows:reference="xs:double"/>
      <ows:AllowedValues>
        <ows:Value/>
      </ows:AllowedValues>
    </LiteralData>
  </Input>
</DataInputs>
```



# Example WPS description

```
<ProcessOutputs>
  <Output>
    <ows:Identifier>SIMPLIFIED_FEATURES</ows:Identifier>
    <ows:Title>smooth geometries</ows:Title>
    <ows:Abstract>GML stream of the smooth feature</ows:Abstract>
    <ComplexOutput>
      <Default>
        <Format>
          <MimeType>text/XML</MimeType>
          <Schema>http://schemas.opengis.net/..feature.xsd</Schema>
        </Format>
      </Default>
    </ComplexOutput>
  </Output>
</ProcessOutputs>
```

# Example WPS request

```
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
<wps:Execute service="WPS" version="1.0.0"
  xmlns:wps="http://www.opengis.net/wps/1.0.0"
  xmlns:ows="http://www.opengis.net/ows/1.1"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.opengis.net/wpsExecute_request.xsd">
  <ows:Identifier>DoubleAddition</ows:Identifier>
```

# Example WPS request

```
<wps:DataInputs>
  <wps:Input>
    <ows:Identifier>input_a</ows:Identifier>
    <wps:Data>
      <wps:LiteralData>7</wps:LiteralData>
    </wps:Data>
  </wps:Input>
  <wps:Input>
    <ows:Identifier>input_b</ows:Identifier>
    <wps:Data>
      <wps:LiteralData>7</wps:LiteralData>
    </wps:Data>
  </wps:Input>
</wps:DataInputs>
```

# Example WPS request



```
<wps:ResponseForm>  
  <wps:ResponseDocument storeExecuteResponse="false">  
    <wps:Output asReference="false">  
      <ows:Identifier>result</ows:Identifier>  
    </wps:Output>  
  </wps:ResponseDocument>  
</wps:ResponseForm>  
</wps:Execute>
```

# Example WPS response

```
<?xml version="1.0" encoding="UTF-8"?>
<wps:ExecuteResponse service="WPS" version="1.0.0"
  xmlns:wps="http://www.opengis.net/wps/1.0.0"
  xmlns:gml="http://www.opengis.net/gml"
  xmlns:ows="http://www.opengis.net/ows/1.1"
  xmlns:xlink="http://www.w3.org/1999/xlink">
  <wps:Process wps:processVersion="1.0.0">
    <ows:Identifier>DoubleAddition</ows:Identifier>
    <ows:Title>DoubleAddition</ows:Title>
  </wps:Process>
  <wps:Status creationTime="2008-07-09T17:02:22.765Z">
    <wps:ProcessSucceeded> succeeded</wps:ProcessSucceeded>
  </wps:Status>
```

# Example WPS response



```
<wps:ProcessOutputs>
  <wps:Output>
    <ows:Identifier>result</ows:Identifier>
    <ows:Title>Result value</ows:Title>
    <wps:Data>
      <wps:LiteralData dataType="xs:double">14.0</wps:LiteralData>
    </wps:Data>
  </wps:Output>
</wps:ProcessOutputs>
</wps:ExecuteResponse>
```

# Tools

- Tool for visualization of WFS and WPS invocation: uDig (User-friendly Desktop internet GIS), obtainable from: <http://udig.refractions.net/>
- Needs WPS client plugin from <http://52north.org/maven/project-sites/wps/52n-wps-client-udig-site/>
- For communication analysis: Wireshark, obtainable from <http://www.wireshark.org/>
- Detailed tutorial: [https://52north.org/twiki/pub/Processing/52nUdigWPSClient/52n\\_WPS\\_hands-on\\_tutorial.pdf](https://52north.org/twiki/pub/Processing/52nUdigWPSClient/52n_WPS_hands-on_tutorial.pdf)



Thank you for your attention