

Interoperable geoprocesses on the Web with R

Domain scientists analyze geospatial data in the form of scripts. Publishing geoprocesses as web services allows easy reuse and sharing of algorithms, as well as, their integration in spatial information infrastructures and GIS.

The 52°North WPS is based on the Open Geospatial Consortium's (OGC) Web Processing Service (WPS) interface standard. This WPS framework enables the sharing of resources for spatial statistics and analyses of geospatial data on the web. Script developers or domain scientists can easily extend scripts with the required metadata and publish their scripts as standardized web processes. The WPS processes can be directly integrated into desktop applications (e.g. ArcGIS, Quantum GIS), web pages (e.g. wps-js) or service oriented architectures. User interaction takes place via the web API. Since the scripts can be downloaded and all components are open source, the entire WPS process is reproducible.

WPS4R is a processing backend for the 52°North WPS. It serves as a collaboration platform for analysts, IT staff and developers. The analysts' annotated scripts are used to provide process metadata, load input data, and store and return process outputs. IT experts operate the WPS platform and software developers integrate processes into applications based on the OGC WPS standard. The 52°North WPS connects to an Rserve server (<http://www.rforge.net/Rserve/>) for script execution.

52°North and community members successfully deploy WPS4R in productive settings and research projects. The project is published under GNU General Public License, Version 2.0 and the source code is available on GitHub (<https://github.com/52North/WPS>).

Documentation can be found in the 52°North Wiki (<https://wiki.52north.org/bin/view/Geostatistics/WPS4R>).

52°North WPS4R

Annotation as source code comment and usage of input parameter in R:

```
# wps.in: attributename, type = string,
# title = "Attribute name", abstract = "Name of the
# interpolated attribute";
interpolation <- gstat::idw(paste(attributename, "~ 1"),
inputPoints, outputRaster)
```

Process description example:

```
<Input minOccurs="1" maxOccurs="1">
  <ows:Identifier>attributename</ows:Identifier>
  <ows:Title>Attribute name</ows:Title>
  <ows:Abstract>Name of the interpolated
  attribute</ows:Abstract>
  <LiteralData>
    <ows:DataType ows:reference="xs:string" />
    <ows:AnyValue />
  </LiteralData>
</Input>
```

The 52°North WPS also supports processing backends for Java, ArcGIS, Python, GRASS and SEXTANTE (<https://52north.org/wps>).

