Compliance Testing of Open Source Software for Web Processing Services

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9th September 2010
No Shootout!
Compliance!
History Class

2005

WPS 0.4.0 Candidate (09/2005)

2007

52N WPS 0.x (05/06)

PyWPS 1.0.0 (11/06)

52N WPS 1.0 (12/07)

WPS 1.0.0 (06/2007)

2008

52N WPS 2.0 (01/09)

PyWPS 2.0.0 (09/07)

2009

52N WPS 2.0 (01/09)

PyWPS 3.0.0 (09/08)

2010

Deegree WPS (deegree 2.3) (04/10)

Deegree WPS (deegree 2.2) (12/08)

It’s time for compliance!
Compliance is crucial

• Open Source products
• Transparency
• Flexibility for the users
• Supports the community!
• THE argument over proprietary standards
Compliance a prerequisite
WPS 101

- Data ➔ Information
- HTTP / XML
Interoperability

• OGC WPS Compliance
  – Compliant WPS responses
  – Full support of the specification
    • Store, asynchronous, synchronous

• Product interoperability
  – Real-world problem
SETUP
Test environment

• Intel Dual core CPU @ 1.66 GHz on a Dell laptop
• Ubuntu 10.4
• Tomcat 6.0.26/Apache2
• Java 6
Candidate Services

52north

PyWPS

zoo
deegree
### Service facts

<table>
<thead>
<tr>
<th>Environment</th>
<th>52north</th>
<th>Python/Apache</th>
<th>deegree</th>
<th>C/Apache</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested version</td>
<td>2.0.0 rc 5</td>
<td>3.2</td>
<td>rc: 3.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Stated compliance</td>
<td>Full</td>
<td>Full – with limitations</td>
<td>Full</td>
<td>Full</td>
</tr>
<tr>
<td>Installation successful</td>
<td>yes</td>
<td>yes</td>
<td>yes - Requires tomcat 6</td>
<td>Internal Server error: cannot find libjavaplugin_jni.so</td>
</tr>
<tr>
<td>Remote endpoint</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>
### Remote endpoints

<table>
<thead>
<tr>
<th>Service</th>
<th>Endpoint URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>deegree</td>
<td><a href="http://deegree3-testing.deegree.org/deegree-wps-demo/services">http://deegree3-testing.deegree.org/deegree-wps-demo/services</a></td>
</tr>
<tr>
<td>PyWPS</td>
<td><a href="http://apps.esdi-humboldt.cz/cgi-bin/wps/wps">http://apps.esdi-humboldt.cz/cgi-bin/wps/wps</a></td>
</tr>
<tr>
<td>52north</td>
<td><a href="http://giv-wps.uni-muenster.de:8080/wps/WebProcessingService">http://giv-wps.uni-muenster.de:8080/wps/WebProcessingService</a></td>
</tr>
<tr>
<td>ZOO</td>
<td><a href="http://zoo-project.org/zoosoo/">http://zoo-project.org/zoosoo/</a></td>
</tr>
</tbody>
</table>
Not tested... Sorry!

GeoServer

4. WPS - Web Processing Service

This documentation is no longer maintained. Please see the new GeoServer documentation at http://docs.geoserver.org

General

Unsupported

The WPS module is currently a work-in-progress and not supported as part of the standard GeoServer configuration.
## Candidate Clients

<table>
<thead>
<tr>
<th></th>
<th>Version</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>XML Clients</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>uDig</td>
<td>1.3</td>
<td>yes</td>
</tr>
<tr>
<td>52N OpenLayers</td>
<td>1.0</td>
<td>yes</td>
</tr>
<tr>
<td>QGIS</td>
<td>1.5.0</td>
<td>no</td>
</tr>
<tr>
<td>gvSIG</td>
<td>1.10</td>
<td>no</td>
</tr>
<tr>
<td>JUMP</td>
<td>1.3.2 w/ 2.0 rc1</td>
<td>yes</td>
</tr>
</tbody>
</table>
Client Test procedure

- Server Login
- Process selection
- Process Execution
  - Buffer
- Applied data
  - LineString Features from WFS (Tasmanian roads)
  - No raster data
OGC Compliance

• Validated with XMLSpy
• GetCapabilities (HTTP-GET)
• DescribeProcess (HTTP-GET)
• Execute (HTTP-POST)
  – Store
  – Synchronous
  – Asynchronous
Product Compliance

RESULTS
XML Clients

WPS TestClient...

Select or enter a request in the upper frame and click the "SEND" button.
After processing, the service response will be displayed in the lower frame.
# XML Clients - results

<table>
<thead>
<tr>
<th></th>
<th>Deegree Client</th>
<th>52°North test client</th>
</tr>
</thead>
<tbody>
<tr>
<td>deegree</td>
<td>✔</td>
<td>×</td>
</tr>
<tr>
<td>PyWPS</td>
<td>✔</td>
<td>×</td>
</tr>
<tr>
<td>52north</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>ZOO</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>
uDig

Input/Output not supported

Metadata not compliant

Metadata not compliant

PyWPS

52north

ZOO

Input/Output not supported

Metadata not compliant

Metadata not compliant
OpenLayers

ProcessID not found

Dummy/literal data process work

No processes found
JUMP

- Input/Output not supported
- Metadata not compliant

---

deegree

PyWPS

52north

ZOO

Metadata not compliant
OGC Compliance

RESULTS
GetCapabilities

• HTTP-GET Query

REQUEST=GetCapabilities&SERVICE=WPS&version=1.0.0

<table>
<thead>
<tr>
<th>deegree</th>
<th>PyWPS</th>
<th>52north</th>
<th>ZOO</th>
</tr>
</thead>
<tbody>
<tr>
<td>✅</td>
<td>✗</td>
<td>✅</td>
<td>✗</td>
</tr>
<tr>
<td>processVersion=&quot;1.0.0&quot; missing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;ows:Metadata xlink:Test=&quot;Demo&quot;/&gt; invalid</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DescribeProcess

• HTTP-GET Query
 REQUEST=DescribeProcess&Service=WPS&version=1.0.0&identifier=XXX

• Example process buffer

<table>
<thead>
<tr>
<th>deegree</th>
<th>pyWPS</th>
<th>52north</th>
<th>ZOO</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>MimeType wrong namespace</td>
<td>wrong element dataType in Format</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Execute

• HTTP-POST
• Example process buffer

<table>
<thead>
<tr>
<th></th>
<th>Sync</th>
<th>Store</th>
<th>async</th>
</tr>
</thead>
<tbody>
<tr>
<td>deegree</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>PyWPS</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>52north</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ZOO</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>
CONCLUSION
Conclusion

• Compliance a prerequisite for successful Open Source software
  – Compliance between products
    – pair-wise
    – Client-Server
  – Spec compliance
• Results are not OGC certified!
• Standardized test suite required
• Output/Input problem
• Validate your schemas!
Conclusion (contd.)

<table>
<thead>
<tr>
<th>Client-Server interoperability</th>
<th>XML</th>
<th>uDi</th>
<th>OL</th>
</tr>
</thead>
<tbody>
<tr>
<td>deegree</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>PyWPS</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
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<tr>
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<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OGC Compliance</th>
<th>Cap</th>
<th>Des</th>
<th>stor</th>
<th>syn</th>
<th>asc</th>
</tr>
</thead>
<tbody>
<tr>
<td>deegree</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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</tr>
<tr>
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<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>
Invitation...

• Compliance testing with volunteers
• Stand up with demo servers
• Join the team
  – Mailing list
  – Wiki
Thanks for your attention!

swsl.uni-muenster.de
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