Conformance Test Engines for quality assurance of INSPIRE Services

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ACE-GIS Project

• IST-2001-37724
• Goal: develop software platforms for facilitating Web Service Composition
  – GI services
  – E-Commerce services
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<td>ionic software</td>
</tr>
<tr>
<td>UNIVERSITAT JAUME-I</td>
<td>ifgi</td>
</tr>
<tr>
<td>eblana</td>
<td>inescid lisboa</td>
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</tbody>
</table>
ACE-GIS architecture
Conformance testing

- **Does my service conform to published specifications?**
  - Most IT organizations offer conf testing
  - Our case: WMS/WFS
- **It works for me, but is it likely to work with others?**
- **NO guarantee of interoperability, however chances will be greater among conformant services**
Compliance & Interoperability Testing & Evaluation Initiative

The OGC Compliance & Interoperability Testing & Evaluation (CITE) Initiative is an ongoing initiative of the OGC that is building tests for OGC specifications. CITE-1, the first in the series, developed a planning and feasibility study that helped to refine the existing Compliance Testing Program. CITE-1 developed a scriptable compliance testing engine and tests for WMS 1.1.1 and WFS 1.0, as well as a validation capability for GML 2.1.2. The CITE-1 initiative also developed Reference Implementations for WMS and WFS and this important portal resource.

CITE-related work may occur within other Interoperability Initiatives (such as OWS-2) or may also occur in focused initiatives in the future. CITE-related work can also be accomplished completely outside of initiatives and, in fact, OGC strongly encourages those who are able to do just that! We only ask that you notify us of your intent so that we can coordinate these activities to avoid redundant or conflicting work.

OGC welcomes you to this portal resource and encourages you to engage us to any extent possible in helping to make OGC testing even better!

Thanks,

Kurt Buehler
VP/CTO, Open GIS Consortium, Inc.

Latest news

> WMS, WFS Tests, and CITE Portal Goes Live!
Announcement of the Beginning of Testing of WMS 1.1.1 and WFS 1.0 and of the CITE Portal Launch
About the Open GIS Consortium Compliance Testing Program

The purpose of the Testing Program is to help vendors and users to take advantage of the valuable OpenGIS® Implementation Specifications that OGC has created. The program provides a process for testing compliance of products to OpenGIS® Implementation Specifications, and, eventually, for testing interoperability between compliant products.

Once compliance testing occurs and is successfully completed, OGC will license vendors of such systems to use OGC’s marks (trademarks or certification marks) that will identify to users the capability of products with respect to OpenGIS® Implementation Specifications. Interoperability Testing will be implemented as a service and will NOT result in the use of OGC marks.

Please visit the Compliance Testing Program pages of the main OGC web site for more details on the programmatic aspects of OGC compliance testing.
Test a service

In order to get started with service testing, you should first understand four key terms. The test engine is a software product that can run scripts. A test script is an XML file that describes a request to send to a server, and an expected response from the server. Test scripts are often referred to as simply tests. We currently have a set of test scripts for Web Mapping services, and a set of test scripts for Web Feature services—the test engine is the same. Our set of tests are the official ones, and the ones required for compliance certification, but you may write your own scripts to test whatever requests and responses you like (if you would like to share your scripts with others, go to the Sandbox). When you want to run a set of tests against a specific server, call that a test session. A test session saves the server and test information along with a record of which tests have passed or failed. This allows you to come back another day and pick up where you left off.

The final term to know is test data. Compliance tests are much more predictable (and shorter!) when everyone tests with the same data. To pass all of the official WMS and WFS tests, you will need to install the appropriate WMS or WFS test data on your server. The engine may be able to run some of the tests even if you skip this step, but most of the tests depend on the dataset, so a larger set of tests will be executed when the dataset is properly implemented. The service will not pass certification testing if you skip this step.

With this terminology in mind, you should have little trouble following the more thorough instructions below that guide you through the steps of:

1. Creating an account
2. Creating a test session
3. Executing tests
4. Examining test results

The compliance process ends with certification. This is an oﬄine procedure which can be initiated by contacting OGC at compliance@opengis.org.

Web Map Service 1.1.1
Test implementations of Web Map Service 1.1.1 servers.

Web Feature Service 1.0.0
Test implementations of Web Feature Service 1.0.0 servers.
ACE-GIS Conformance Tests

Conformance Test

Conformance testing provides a means for determining if an implementation satisfies the requirements and specifications of a standard.

Conformance tests capture the technical description of a specification and help determine whether a product faithfully implements the specification. The testing provides relevant parties such as developers, purchasers, or users increased levels of confidence in product quality and increases the probability of successful interoperability.

Here we provide conformance testing for two of the key web services developers would normally integrate into a service chain involving geographic information.

WMS Conformance Testing
Access to the WMS Conformance Suite.
For help on the use of this test, or to send comments or critique e-mail.

WFS Conformance Testing
Access the WFS Conformance Test suite.
For help on the use of this test, or to send comments or critique e-mail.

NOTE: these tests of WMS and WFS are made freely available to assist software developers in creating clean services, which helps improve interoperability. HOWEVER, if you are looking for compliance certification of your service, you should visit the OGC testing web pages at: http://www.opengis.org/resources/?page=testing
### ACE-GIS Web Map Services Test Engine

**URL Information:**

Enter a WMS URL: http://www2.dmsolutions.es/cgi-bin/mswms_gmap

**OpenGIS Specifications:**

OGC Specification: WMS  
OGC Version: 1.1.1

**GetCapabilities Information:**

Show GetCapabilities Information: Yes

**Test Assertions: (Select at least one)**

- GetCapabilities Validation
- GetCapabilities Deprecated Names
- GetCapabilities UPDATESEQUENCE Parameter

**GetMap:**

- GetMap Deprecated Names
- GetMap LAYERS Parameter
- GetMap STYLES Parameter
- GetMap SRS Parameter
- GetMap BBOX Parameter
- GetMap FORMAT, HEIGHT, WIDTH Parameters
- GetMap TRANSPARENT, BG COLOR Parameters
- GetMap EXCEPTIONS Parameters
- GetMap DIMENSIONS Parameters

**GetFeatureInfo:**

- GetFeatureInfo QUERY LAYERS Parameter
ACE-GIS Web Map Services Test Engine

**DESCRIPTION:** getCapabilities deprecated names

### TASK 1
**DESCRIPTION:** Retrieve Capabilities document using alternate parameter WMTVER instead of VERSION.
**REQUIRED:** No
**REQUEST:** http://www2.dmsolutions.ca/cgi-bin/mswms_gmap?SERVICE=WMS&WMTVER=1.1.1&REQUEST=GetCapabilities
**RESPONSE:** application/vnd.ogc.wms_xml

```xml
<?xml version='1.0' encoding="ISO-8859-1" standalone="no" ?>
<!DOCTYPE WMT_MS_Capabilities SYSTEM "http://www.digitalearth.gov/wmt/xml/capabilities_1_1_0.dtd"
[
 Element VendorSpecificCapabilities EMPTY
 ]>  <!-- end of DOCTYPE declaration -->

<WMT_MS_Capabilities version="1.1.0" updateSequence="0">

```

**STATUS:** PASSED

### TASK 2
**DESCRIPTION:** When REQUESTis "capabilities", then the response is Capabilities XML.
**REQUIRED:** No
**REQUEST:** http://www2.dmsolutions.ca/cgi-bin/mswms_gmap?SERVICE=WMS&VERSION=1.1.1&REQUEST=capabilities
**RESPONSE:** application/vnd.ogc.wms_xml

```xml
<?xml version='1.0' encoding="ISO-8859-1" standalone="no" ?>
<!DOCTYPE WMT_MS_Capabilities SYSTEM "http://www.digitalearth.gov/wmt/xml/capabilities_1_1_0.dtd"
[
 Element VendorSpecificCapabilities EMPTY
 ]>  <!-- end of DOCTYPE declaration -->

<WMT_MS_Capabilities version="1.1.0" updateSequence="0">

```

**ERRORS:**
The element OGCWebServiceException is unknown

**STATUS:** FAILED
Web Feature Server tester
ACE-GIS Web Feature Services Test Engine

This engine is used to test conformance to OpenGIS Web Service.

<table>
<thead>
<tr>
<th>WFS Test Engine Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request Method: GET</td>
</tr>
<tr>
<td>Tests: (Select at least one)</td>
</tr>
<tr>
<td>GetCapabilities Tests:</td>
</tr>
<tr>
<td>DescribeFeatureType Tests:</td>
</tr>
<tr>
<td>GetFeature Tests:</td>
</tr>
<tr>
<td>Deselect All Tests</td>
</tr>
<tr>
<td>Select All Tests</td>
</tr>
<tr>
<td>Run Tests</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter a WFS URL: <a href="http://darvici.dlsi.uji.es:8080/geoserver/wfs">http://darvici.dlsi.uji.es:8080/geoserver/wfs</a></td>
</tr>
<tr>
<td>Run WFS Test Configuration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GetCapabilities Options:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP GET URL:</td>
</tr>
<tr>
<td>HTTP POST URL:</td>
</tr>
<tr>
<td>Basic Options:</td>
</tr>
<tr>
<td>Lower and Upper Web Feature Service Version Number to Test:</td>
</tr>
<tr>
<td>Lower Version: 0.0.0 Upper Version: 99.99.99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DescribeFeatureType Options:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP GET URL:</td>
</tr>
<tr>
<td>HTTP POST URL:</td>
</tr>
<tr>
<td>Basic Options:</td>
</tr>
<tr>
<td>Select Two FeatureTypes with same namespaces:</td>
</tr>
<tr>
<td>Select Two FeatureTypes with distinct namespaces:</td>
</tr>
</tbody>
</table>
ACE-GIS Web Feature Services Test Engine

This engine is used to test conformance to OpenGIS Web Service.

**GetCapabilities Options:**
- HTTP GET URL: http://davinci.dlsi.ujii.es:8080/geoserver/wfs/GetCapabilities
- HTTP POST URL: http://davinci.dlsi.ujii.es:8080/geoserver/wfs/GetCapabilities

**Basic Options:**
- Lower and Upper Web Feature Service Version Number to Test:
  - Lower Version: 0.0.0

**DescribeFeatureType Options:**
- HTTP GET URL: http://davinci.dlsi.ujii.es:8080/geoserver/wfs/DescribeFeatureType
- HTTP POST URL: http://davinci.dlsi.ujii.es:8080/geoserver/wfs/DescribeFeatureType

**Basic Options:**
- Select Two FeatureTypes with same namespaces:
  - highways.highways
  - hydrographic:ntadhydrolin
  - hydrographic:ntadhydropol

**Select Two FeatureTypes with distinct namespaces:**
- county:county
- fire:fire
- flood:flood
ACE-GIS Web Feature Services Test Engine

This engine is used to test conformance to OpenGIS Web Service.

**General Statistics:**
- **Total Number of Tests:** 64
- **Total Execution Time (seconds):** 18.547
- **Total Passed Tests:** 44
- **Total Amount of Memory Used (MB):** -0.09831238

**GetCapabilitiesBasic Tests:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GetCapabilitiesBasic/001</td>
<td>The request will define the version number to be 1.0.0. The response document will be tested to check if the capabilities document is the same as the requested version.</td>
</tr>
<tr>
<td>GetCapabilitiesBasic/002</td>
<td>The request will define the version number to be 99.99.99. The response document will be tested to check if the capabilities document is less than 99.99.99.</td>
</tr>
<tr>
<td>GetCapabilitiesBasic/003</td>
<td>The request will define the version number to be 0.0.0. The response document will be tested to check if the capabilities document is greater than 0.0.0.</td>
</tr>
<tr>
<td>GetCapabilitiesBasic/004</td>
<td>The request will not define a version number. The response document will be tested to check if the capabilities document is greater than 0.0.0.</td>
</tr>
<tr>
<td>GetCapabilitiesBasic/005</td>
<td>The response document will be tested to check that the capabilities document defines the capability to describe features for HTTP GET or POST and the GetFeature request for HTTP GET or POST. This test does not work, this is done in other tests.</td>
</tr>
<tr>
<td>GetCapabilitiesBasic/006</td>
<td>The response document will be tested to check that the DescribeFeatureType request has a SchemaDataObject.</td>
</tr>
<tr>
<td>GetCapabilitiesBasic/007</td>
<td>The response document will be tested to check that the GetFeature request has a ResultFormat of GML.</td>
</tr>
<tr>
<td>GetCapabilitiesBasic/008</td>
<td>The response document will be tested to check that the global FeatureTypeList or at least one FeatureType is required.</td>
</tr>
</tbody>
</table>
Comparison

• CITE
  - Official OpenGIS programme
  - Certification possibility
  - Download and install test suite and test data
  - Registration required

• ACE-GIS
  - Quick-and-dirty testing
  - Anonymous access
  - Test any server, any data
  - Test suite source code (servlets) available LGPL
  - Probably through Geoserver project
Welcome to the GeoServer Project

The GeoServer project is a full transactional Java (J2EE) implementation of the OpenGIS Consortium's Web Feature Server specification, with an integrated WMS. It is free software, available under the GPL 2.0 license. Users who would like to access and modify their geographic data over the Internet using flexible, industry-approved standards should take a look at GeoServer or one of the existing commercial Web Feature Servers. If you are interested in a deeper examination of the importance of the GeoServer Project, you should read our FAQ, where we have more descriptive explanations.

Announcement: GeoServer 1.2.0-rc2 Available
Posted by Chris Holmes on Sunday, June 20, 2004 - 11:23 PM PDT

GeoServer 1.2.0-rc2 is now available, hopefully eliminating the last of the bugs for 1.2.0. We also updated the installation documentation and added more demo requests. All that remains for 1.2.0 is a lot of testing and some more documentation updates. Please help us move to the final 1.2.0 release by giving feedback, anything that's missing or wrong or that you'd like to see. Report feature requests and bugs to the task tracker, or email us directly at geoserver-devel@lists.sourceforge.net. The release is available for download at http://sourceforge.net/project/showfiles.php?group_id=25086&package_id=384108&release_id=247026 and the documentation is available at http://geoserver.sourceforge.net/documentation/1.2.0-rc2

Announcement: GeoServer 1.2.0-rc1 Has Arrived
Posted by Chris Holmes on Thursday, April 22, 2004 - 11:30 PM PDT

Read more... (1062 bytes more)
ACE-GIS hands-on seminar
• 3 September 2004, Zaragoza Spain
• Held during DEXA’04 conference and GIM’04 workshop
– www.dexa.org
Conclusions

• Conformance testing useful for quality assurance in multi-service use cases
  – As will become common in INSPIRE

• Two options available for OpenGIS service testing
  – NOT competitors: each has a niche

• ACE-GIS project making WMS and WFS tester servlets available as free software
Thanks for your attention.

• www.acegis.net

• gould@uji.es