Suggestions for writing Abstract Test Suites (ATS) for INSPIRE conformance testing for Metadata and Network Services

MIWP-5 Workshop
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Agenda

• Definition
• Examples
  • INSPIRE ATS
  • GDI-DE Testsuite
  • OGC WFS 2.0
  • What others do
• Guidelines
• Workflow and tasks
Abstract Test Suite (ATS)

- Conceptual level validation
- Already used in different project for conformance testing (ISO, OGC e.g.)
- Defined structure
- Scope: Each requirement should have a corresponding test
INSPIRE ATS (data specifications) - scope

“Any data set claiming conformance to this INSPIRE data specification shall pass the requirements described in the abstract test suite presented in Annex A to this specification.”

• Set of tests including their structure to verify conformity with INSPIRE Data Specifications
• Purpose of the ATS is to primarily help data providers to deal with the requirements
• ATS may be used for the whole data set, as well as for any piece of it
INSPIRE ATS – structure

- Tests of the ATS follow Implementing Rule (IR) and Technical Guidelines (TG) requirements that are common to all INSPIRE data specifications and if relevant theme specific requirements.
- Each conformance class comprises 1..N (one to many) tests.
- Each test follows the same structure:
  - Test purpose: definition of intended scope of the test;
  - Test method: description of the testing procedure;
  - Reference: link to any material that may be useful;
  - Test type: explicit designation whether this test reflects the IR or the TG requirement.

- Adoption of the OGC ATS structure.
A.9.2 Metadata encoding schema validation test

a) Purpose: Verify whether the metadata follows an XML schema specified in ISO/TS 19139.

b) Test Method: Inspect whether provided XML schema is conformant to the encoding specified in ISO 19139 for each metadata instance.

c) Reference: Section 8 of this technical guideline, ISO/TS 19139

NOTE 1: Section 2.1.2 of the Metadata Technical Guidelines discusses the different ISO 19139 XML schemas that are currently available
GDI-DE Testsuite - overview

- Based on OGC TEAM Engine v2, test language: CTL
- Conformity tests for
  - Metadata (ISO, INSPIRE, GDI-DE)
  - Catalogue Services (OGC/ISO CSW, INSPIRE Discovery Service)
  - Web MapServices (OGC/ISO WMS, INSPIRE View Service)
  - Atom feeds (INSPIRE Download Service)
- Test development
  - Generate ATS document (descriptive)
  - Generate CTL conformance classes
  - Regenerate ATS from CTL through XSLT
- Adoption of the OGC ATS structure
### GDI-DE Testsuite – example 1

#### Resource locator

<table>
<thead>
<tr>
<th>Test case identifier</th>
<th>md_224</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test purpose</td>
<td>If a linkage is available, a resource locator must be given.</td>
</tr>
<tr>
<td>Test method</td>
<td>The test first checks if a linkage is given at <code>gmd:distributionInfo/*/gmd:transferOptions/*/gmd:onLine/*/gmd:linkage</code>. If none is given, the test will complete successfully. If one is given, the test checks if the linkage element contains an element of type <code>gmd:URL</code>. A validity check of the contained URL using regular expressions is performed. If the test evaluates to negative, a warning is thrown.</td>
</tr>
<tr>
<td>Reference</td>
<td>INSPIRE Metadata Implementing Rules, Chap. 2.2.4</td>
</tr>
<tr>
<td>Test type</td>
<td>Basic test</td>
</tr>
</tbody>
</table>
GDI-DE Testsuite – example 2

**Download Service Feed: feed „rights“ element**

<table>
<thead>
<tr>
<th>Test case ID</th>
<th>INSPIRE_DLS.DownloadServiceFeed.5.10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test purpose</td>
<td>Verify that the feed shall contain an Atom &quot;rights&quot;·element, that should contain information about rights and restrictions (TG Req. 10).</td>
</tr>
<tr>
<td>Test method</td>
<td>Pass if the feed shall contain an Atom &quot;rights&quot;·element, that should contain information about rights and restrictions (TG Req. 10).</td>
</tr>
<tr>
<td>Reference</td>
<td>Link to ATS entry for this test (self)</td>
</tr>
<tr>
<td>Test type</td>
<td>Capability</td>
</tr>
</tbody>
</table>
OGC ATS

Example:

OGC® Web Feature Service 2.0 Interface Standard - Annex A
http://docs.opengeospatial.org/is/09-025r2/09-025r2.html#309
A.2.3 Invalid version number

Test Purpose
To verify that a request, other than a GetCapabilities request, with the version number set to one that the server does not claim to support in its capabilities document fails.

Test Method
Review the response to the GetCapabilities request and determine which request version(s) the server claims to support. Execute one or more WFS requests with a version that is not in the list of supported version and verify that the server generates an InvalidParameterValue exception.

References
6.2.2

Test Type
Basic
What others do - W3C

- “A Method for Writing Testable Conformance Requirements” (http://www.w3.org/TR/test-methodology/)

Define (e.g.)

- Common mistakes
- Structural Components of a Conformance Requirement
- Conventions for Marking-up Conformance Requirements
- Testable Assertions and Test Cases
Common mistakes

• Creating conformance requirements for products that don’t have behavior, e.g. “an XML file must be well-formed.” — this cannot be tested since it doesn’t say what the outcome is on that condition.

• Using a passive voice for describing the behavior, e.g. “an invalid XML file must be ignored” — this hides what product is supposed to follow the prescribed behavior.

• Using under-defined behaviors, e.g. “a user agent must reject malformed XML” without defining the algorithmic process that is to “reject” something — this makes it impossible to define the outcome of the testable assertion.
## Structural Components of a Conformance Requirement

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product:</strong></td>
<td>A product that is supposed to follow the requirement.</td>
</tr>
<tr>
<td><strong>Strictness level:</strong></td>
<td>The strictness of the applicability of the requirement to a product. W3C specifications use the keywords (must, should, may, etc.) to indicate the level of requirement that is imposed on a product.</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>An explanation of the prerequisites that need to be in place in order for the requirement to apply.</td>
</tr>
<tr>
<td><strong>Behavior:</strong></td>
<td>a clear explanation of what the product is supposed to do.</td>
</tr>
<tr>
<td><strong>Terms:</strong></td>
<td>Keywords that are relevant to understanding how to apply the desired behavior.</td>
</tr>
</tbody>
</table>
Example

"If a user agent encounters a file matching a file name given in the file name column of the default start files table in an arbitrary folder, then user agent must treat that file as an arbitrary file."

Product: the user agent
Strictness level: must
Prerequisites: If a user agent encounters a file matching a file name given in the file name column of the default start files table in an arbitrary folder
Behavior: treat that file as an arbitrary file
Terms: "file", "folder", "file name", "arbitrary", "default start files table"
Test Assertions Guidelines Version 1.0

http://docs.oasis-open.org/tag/guidelines/v1.0/cn02/guidelines-v1.0-cn02.html#RefHeading_8639_157636900
Guidelines for ATS development

What we need:

• Hierarchial structure
  • Conformance class -> validation test (for each requirement)

• Defined structure of each test
  • Use of OGC and INSPIRE structure recommended
  • Approved approach (used in different projects)

• Same Logic (phrases)
  • Identifier for each test
  • Consistent semantics (e.g. “to pass, a must equal b.” or „Test if attribute x contains a value of type y from codelist z“)
  • Conventions
Workflow

1. Definition of conventions for writing ATS documents
   1. Structure
   2. Semantics

2. Definition of ATS tests based on the TG documents by experts
   1. Based on the workshop results

3. Discussion about potential misinterpretations and technical practicability
   1. With developers
   2. Build a bridge to ETS implementation
Thank you for your kind attention!

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