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Editor: Peter Baumann

OGC® Web Coverage Service 2.0 Interface Standard - XML/SOAP Protocol Binding Extension

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i. Preface

This document specifies an extension to the OGC Web Coverage Service (WCS) 2.0 core to allow for client/server communication using SOAP with XML encoding.

ii. Terms and definitions

This document uses the specification terms defined in Subclause 5.3 of [OGC 06-121r9], which is based on the ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards. In particular, the word “shall” (not “must”) is the verb form used to indicate a requirement to be strictly followed to conform to this standard.

iii. Submitting organizations

The following organizations have submitted this Implementation Specification to the Open Geospatial Consortium, Inc.:

- Jacobs University Bremen
- National Center for Atmospheric Research (NCAR)
- Oracle USA
- PCI Geomatics Inc.
- ERDAS, Inc.
- EOX IT Services GmbH
- Spot Image
- BAE Systems - C3I Systems
- Natural Environment Research Council (NERC)
- George Mason University

iv. Document Contributor Contact Points

Name	Organization
Peter Baumann	Jacobs University Bremen, rasdaman GmbH

v. Revision history

Date	Release	Author	Paragraph modified	Description
2009-11-02	0.0.1	PB	All	Created

vi. Changes to the OpenGIS[®] Abstract Specification

The OpenGIS[®] Abstract Specification does not require any changes to accommodate the technical contents of this (part of this) document.

vii. Future Work

Nothing foreseen currently.

Foreword

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Recipients of this document are requested to submit, with their comments, notification of any relevant patent claims or other intellectual property rights of which they may be aware that might be infringed by any implementation of the standard set forth in this document, and to provide supporting documentation.

Introduction

The OGC Web Coverage Service (WCS) supports electronic retrieval of geospatial data as "coverages" – that is, digital geospatial information representing space/time-varying phenomena.

This document specifies an extension to the OGC Web Coverage Service (WCS) 2.0 core to allow for client/server communication using SOAP with XML encoding.

OGC® Web Coverage Service 2.0 Interface Standard - XML/SOAP Protocol Binding Extension

1 Scope

This document specifies how Web Coverage Service (WCS) clients and servers can communicate over the Internet using SOAP with XML encoding.

2 Conformance

Standardization target are WCS 2.0 implementations (currently: servers).

This document establishes a single requirements class, *soap*, of URI http://www.opengis.net/spec/WCS_protocol-binding_soap/1.0/req/soap with a single pertaining conformance class, *soap*, of URI http://www.opengis.net/spec/WCS_protocol-binding_soap/1.0/conf/soap. Requirements and conformance test URIs defined in this document are relative to http://www.opengis.net/spec/WCS_protocol-binding_soap/1.0/.

Annex A lists the conformance tests which shall be exercised on any software artefact claiming to implement an OGC WCS using this extension.

3 Normative references

This *OGC WCS 2.0 SOAP Protocol Binding Extension* specification consists of the present document and an XML Schema. The complete specification is identified by OGC URI http://www.opengis.net/spec/WCS_protocol-binding_soap/1.0, the document has OGC URI http://www.opengis.net/doc/ISx/WCS_protocol-binding_soap/1.0.

The complete specification is available for download from <http://www.opengeospatial.org/standards/wcs>; additionally, the XML Schema is posted online at <http://schemas.opengis.net/wcs/2.0> as part of the OGC schema repository. In the event of a discrepancy between bundled and schema repository versions of the XML Schema files, the schema repository shall be considered authoritative.

The following normative documents contain provisions that, through reference in this text, constitute provisions of this specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the normative document referred to applies.

OGC 06-121r9, *OGC Web Service Common Specification*, version 2.0

Conformance classes used:

- HTTP POST
- SOAP encoding

OGC 09-110r3, OGC® *Web Coverage Service 2.0 Interface Standard - Core*, version 2.0

Conformance classes used:

- Core

4 Terms and definitions

For the purposes of this document, the terms and definitions given in the above references apply.

5 Conventions

5.1 UML notation

All the diagrams that appear in this specification are presented using the Unified Modeling Language (UML) static structure diagram, as described in Subclause 5.2 of OGC Web Service Common [OGC 06-121r9].

5.2 Data dictionary tables

The UML model data dictionary is specified herein in a series of tables. The contents of the columns in these tables are described in Subclause 5.5 of [OGC 06-121r9]. The contents of these data dictionary tables are normative, including any table footnotes.

6 SOAP with XML

Requirement 1 /req/soap/extension-identifier:

A WCS service implementing this extension shall include the following URI in the `Profile` element of the `ServiceIdentification` in a *GetCapabilities* response:

`http://www.opengis.net/spec/WCS_protocol-binding_soap/1.0`

Requirement 2 /req/soap/wcsServiceMetadata:

For those `WCSServiceMetadata` elements inherited from `OWSServiceMetadata`, WCS servers **shall** specify the HTTP POST request encodings accepted by including an `ows:Constraint` element, with “PostEncoding” as the value of the name attribute and with a value of “SOAP” to indicate that SOAP encoding is allowed.

Requirement 3 /req/soap/soap-pattern:

WCS servers and clients implementing this protocol **shall** adhere to SOAP 1.2 for all WCS operation requests and responses. The SOAP Request-Response message exchange pattern **shall** be used with the HTTP POST binding.

Requirement 4 /req/soap/soap-envelope-body:

Each XML-encoded operation request and response **shall** consist of one SOAP Envelope containing exactly one Body. In a request, each Body **shall** contain exactly one WCS request.

Requirement 5 /req/soap/soap-with-attachments:

A *GetCoverage* SOAP response **shall** be encoded as “SOAP with Attachments” as defined in [W3C Note 11], but using SOAP 1.2 rather than SOAP 1.1.

Requirement 6 /req/soap/single-body-element:

In a *GetCoverage* response, the SOAP Envelope **shall** contain one Body element which contains the `Coverage` as its single element.

Requirement 7 /req/soap/soap-fault:

When an error is detected while processing an operation request encoded in a SOAP envelope, the WCS server **shall** generate a SOAP response message where the content of the Body element is a Fault element containing an `ows:ExceptionReport` element [OGC 06-121r9], with the `soap:Value` element having the fixed string “soap:server” and the `soap:Text` having the fixed string “Server exception was encountered.”

Note This fixed string is used since the details of the exception shall be specified in the Detail element using an `ows:ExceptionReport` element as specified in OWS Common [OGC 06-121r9].

To allow WCS extensions to add further parameters the XML Schema `wcs:Request-BaseType` contains an optional element `<extension>` with unbounded cardinality. This way, extensions can add their individual request parameters without (syntactic) interference.

7 WSDL

WCS SOAP bindings are described in file `wcs-soap-binding.wsdl` provided in the `wsdl/` subdirectory of the WCS XML schema tree.

Requirement 8 /req/soap/wsdl:

Publication of a WCS SOAP service endpoint **shall** use the binding as defined in file `wsdl/wcs-soap-binding.wsdl` of the WCS XML package.

NOTE A sample service description relying on this binding is provided in file `example-soap-endpoint.wsdl`.

8 Exceptions**Requirement 9 /req/soap/exceptions:**

When a WCS server encounters an error described in column “meaning of exception code” in Table 1 then it **shall** return the corresponding exception report message with the contents of the `locator` parameter value as specified in the right column of Table 1.

Table 1 — Exception codes for XML/POST operations

exceptionCode value	HTTP code	Meaning of code	locator value
InvalidEncodingSyntax	400	Document received does not conform with protocol syntax.	Name of violating element

Bibliography

- [1] IETF RFC 2387, *The MIME Multipart/Related Content-type*. IETF, 1998
- [2] IETF RFC 2396, *Uniform Resource Identifiers (URI): Generic Syntax*. IETF, 1998
- [3] W3C Note 11, *SOAP Messages with Attachments*. W3C Note 11, 2000

Annex A (normative)

Abstract test suite

A WCS implementing this extension shall pass all of the following tests, plus those of the WCS core [OGC 09-110r3], to be conformant with this specification.

A.1 Conformance Test Class: soap

The OGC URI identifier of this conformance class is:

http://www.opengis.net/spec/WCS_protocol-binding_soap/1.0/conf/soap.

Test identifiers below are relative to http://www.opengis.net/spec/WCS_protocol-binding_soap/1.0/.

A.1.1 Extension identification

Test id: /conf/soap/extension-identifier

Test Purpose: **Requirement /req/soap/extension-identifier:**

A WCS service implementing this extension shall include the following URI in the `Profile` element of the `ServiceIdentification` in a `GetCapabilities` response:

`http://www.opengis.net/spec/WCS_protocol-binding_soap`

Test method: Send a `GetCapabilities` request to the server under test, verify that the response contains a `Profile` element with said URI.

A.1.2 Service metadata

Test id: /conf/soap/wcsServiceMetadata

Test Purpose: **Requirement /req/soap/wcsServiceMetadata:**

For those `WCSServiceMetadata` elements inherited from `OWSServiceMetadata`, WCS servers **shall** specify the HTTP POST request encodings accepted by including an `ows:Constraint` element, with “PostEncoding” as the value of the name attribute and with a value of “SOAP” to indicate that SOAP encoding is allowed.

Test method: Send a `GetCapabilities` request to the server under test, verify that the response satisfies the constraints.

A.1.3 SOAP version and message exchange pattern

Test id: /conf/soap/soap-pattern

Test Purpose: **Requirement /req/soap/soap-pattern:**
WCS servers and clients implementing this protocol **shall** adhere to SOAP 1.2 for all WCS operation requests and responses. The SOAP Request-Response message exchange pattern **shall** be used with the HTTP POST binding.

Test method: Send request of each type to server under test. Check response whether the condition is fulfilled.

A.1.4 SOAP encoding

Test id: /conf/soap/soap-envelope-body

Test Purpose: **Requirement /req/soap/soap-envelope-body:**
Each XML-encoded operation request and response **shall** consist of one SOAP Envelope containing exactly one Body. In a request, each Body **shall** contain exactly one WCS request.

Test method: Send request of each type to server under test. Check response whether the condition is fulfilled.

A.1.5 SOAP *GetCoverage* response encoding

Test id: /conf/soap/soap-with-attachments

Test Purpose: **Requirement /req/soap/soap-with-attachments:**
A *GetCoverage* SOAP response **shall** be encoded as “SOAP with Attachments” as defined in [W3C Note 11], but using SOAP 1.2 rather than SOAP 1.1.

Test method: Send *GetCoverage* request. Check response whether the condition is fulfilled.

A.1.6 SOAP body

Test id: /conf/soap/single-body-element

Test Purpose: **Requirement /req/soap/single-body-element:**
In a *GetCoverage* response, the SOAP Envelope **shall** contain one Body element which contains the Coverage as its single element.

Test method: Send *GetCoverage* request. Check response whether the condition is fulfilled.

A.1.7 SOAP error handling**Test id:** /conf/soap/soap-fault**Test Purpose: Requirement /req/soap/soap-fault:**

When an error is detected while processing an operation request encoded in a SOAP envelope, the WCS server **shall** generate a SOAP response message where the content of the Body element is a Fault element containing an ows:ExceptionReport element [OGC 06-121r9], with the soap:Value element element having the fixed string “soap:server” and the soap:Text having the fixed string “Server exception was encountered.”

Test method: For each request type, send an erroneous request. Check SOAP response document.

A.1.8 WSDL**Test id:** /conf/soap/wsdl**Test Purpose: Requirement /req/soap/wsdl:**

Publication of a WCS SOAP service endpoint **shall** use the binding as defined in file wsdl/wcs-soap-binding.wsdl of the WCS XML package.

Test method: For the service under test, retrieve the WSDL description and issue requests which make use of this service definition. Check that the service can be addressed and that queries can be retrieved properly.

A.1.9 Exceptions**Test id:** /conf/soap/exceptions**Test Purpose: Requirement /req/soap/exceptions:**

When a WCS server encounters an error described in column “meaning of exception code” in Table 1 then it **shall** return the corresponding exception report message with the contents of the locator parameter value as specified in the right column of Table 1.

Test method: Send requests of all types supported to the server under test. Each request shall include all (mandatory and) optional parameters and shall be valid except for one parameter which shall contain an encoding error described in the exception specification. Test passes if exception is reported according to requirement.

-- end of ATS --