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WCS 2.0 Extension -- XML/SOAP Protocol

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Editorial note: revision numbers for the references to documents of the WCS 2.0 set are not yet adjusted; this will be done in the final editing step.

Warning

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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 06-121r8], 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
- rasdaman GmbH
- 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

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v. Revision history

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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.

WCS 2.0 Extension -- XML/SOAP Protocol

1 Scope

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

2 Compliance

Annex A (normative) specifies compliance tests which shall be tested by any service claiming to implement an OGC Web Coverage Service using this extension.

3 Normative references

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.

IETF RFC 2387, *The MIME Multipart/Related Content-type*. IETF, 1998

IETF RFC 2396, *Uniform Resource Identifiers (URI): Generic Syntax*. IETF, 1998

W3C Note 11, *SOAP Messages with Attachments*. W3C Note 11, 2000

OGC 06-121r8, *OGC Web Services Common Specification*, version 1.2

OGC 07-036, *Geography Markup Language (GML) Encoding Standard*, version 3.2.1

OGC 09-110r1, *WCS 2.0 Core*, version 2.0

In addition to this document, the WCS specification includes normative XML Schema files. These are posted online at <http://schemas.opengis.net/wcs/2.0> as part of the OGC schema repository. These XML Schema files are also available bundled with the present document for download from <http://www.opengeospatial.net/standards/wcs>. In the event of a discrepancy between bundled and schema repository versions of the XML Schema files, the schema repository shall be considered authoritative.

4 Terms and definitions

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

4.1

coverage

feature which is a subclass (specialization) of `AbstractCoverage` as specified by GML 3.2 [07-036], based on the abstract definition of [OGC 07-111] and [ISO 19123]

4.2

offered coverage

→*coverage* stored on a server and accessible by clients via WCS operations

NOTE An offered coverage carries service relevant information in addition to the →*coverage* data.

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 Services Common [OGC 06-121r8].

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 06-121r8]. The contents of these data dictionary tables are normative, including any table footnotes.

6 SOAP with XML

Req 1 A WCS service implementing this extension shall include the following URN in the Profile element of the ServiceDescription in a *GetCapabilities* response:
urn:ogc:def:extension:OGC-WCS:2.0:protocol:soap

Req 2 For those WCSServiceMetadata elements inherited from OWSService-Metadata, all rules laid down in [OGC 06-121r8] **shall** apply, plus the following ones:

- 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.

Req 3 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.

Req 4 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.

Req 5 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.

Req 6 In a *GetCoverage* response, the SOAP Envelope **shall** contain one Body element which contains the Coverage as its single element.

Req 7 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 06-121r8], with the soap:Value element 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 06-121r8].

7 WSDL

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

Req 8 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

Req 9 In addition to the exception codes defined in the WCS core [09-110], the code(s) in Table 1 shall be supported.

Table 1 — Exception codes for XML/POST operations

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

Annex A (normative)

Abstract test suite

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

A.1 Conformance Test Class: WCS SOAP protocol

A.1.1 Extension identification

Test Purpose: A WCS service implementing this extension shall include the following URN in the *Profile* element of the *ServiceDescription* in a *GetCapabilities* response:
urn:ogc:def:extension:OGC-WCS:2.0:protocol:soap

Reference: Req 1

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

A.1.2 Service metadata

Test Purpose: For those *WCSServiceMetadata* elements inherited from *OWSServiceMetadata*, all rules laid down in [OGC 06-121r8] **shall** apply, plus the following ones:

- 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.

Reference: Req 2

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 Purpose: 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.

Reference: Req 3

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

NOTE Client testing of this property is not currently addressed in this Abstract Test Suite.

A.1.4 SOAP encoding

Test Purpose: 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.

Reference: Req 4

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

NOTE Client testing of this property is not currently addressed in this Abstract Test Suite.

A.1.5 SOAP *GetCoverage* response encoding

Test Purpose: 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.

Reference: Req 5

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

A.1.6 SOAP body

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

Reference: Req 6

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

A.1.7 SOAP error handling

Test Purpose: 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 06-121r8], with the `soap:Value` element having the fixed string “soap:server” and the `soap:Text` having the fixed string “Server exception was encountered.”

Reference: Req 7

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

A.1.8 WSDL

Test Purpose: 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.

Reference: Req 8

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 Purpose: In addition to the exception codes defined in the WCS core [09-110], the code(s) in Table 1 shall be supported.

Reference: Req 9

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 and for one parameter which shall contain an encoding error.

-- end of ATS --