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Geografske informacije – Vmesnik za spletni kartografski strežnik

Geographic information -Web map server interface

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Geographic information — Web map server interface

Information géographique — Interface de carte du serveur web

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Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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Introduction

A Web Map Service (WMS) produces maps of spatially referenced data dynamically from geographic information. This International Standard defines a "map" to be a portrayal of geographic information as a digital image file suitable for display on a computer screen. A map is not the data itself. WMS-produced maps are generally rendered in a pictorial format such as PNG, GIF or JPEG, or occasionally as vector-based graphical elements in Scalable Vector Graphics (SVG) or Web Computer Graphics Metafile (WebCGM) formats.

This International Standard defines three operations: one returns service-level metadata; another returns a map whose geographic and dimensional parameters are well-defined; and an optional third operation returns information about particular features shown on a map. Web Map Service operations can be invoked using a standard web browser by submitting requests in the form of Uniform Resource Locators (URLs). The content of such URLs depends on which operation is requested. In particular, when requesting a map the URL indicates what information is to be shown on the map, what portion of the Earth is to be mapped, the desired coordinate reference system, and the output image width and height. When two or more maps are produced with the same geographic parameters and output size, the results can be accurately overlaid to produce a composite map. The use of image formats that support transparent backgrounds (e.g. GIF or PNG) allows underlying maps to be visible. Furthermore, individual maps can be requested from different servers. The Web Map Service thus enables the creation of a network of distributed map servers from which clients can build customized maps. Illustrative examples of map request URLs and their resulting maps are shown in Annex G.

This International Standard applies to a Web Map Service instance that publishes its ability to produce maps rather than its ability to access specific data holdings. A basic WMS classifies its geographic information holdings into "Layers" and offers a finite number of predefined "Styles" in which to display those layers. This International Standard supports only named Layers and Styles, and does not include a mechanism for user-defined symbolization of feature data.

NOTE   The Open Geospatial Consortium (OGC) Styled Layer Descriptor (SLD) specification [6] defines a mechanism for user-defined symbolization of feature data instead of named Layers and Styles. In brief, an SLD-enabled WMS retrieves feature data from a Web Feature Service [7] and applies explicit styling information provided by the user in order to render a map.

Geographic information — Web map server interface

1 Scope

This International Standard specifies the behaviour of a service that produces spatially referenced maps dynamically from geographic information. It specifies operations to retrieve a description of the maps offered by a server to retrieve a map, and to query a server about features displayed on a map. This International Standard is applicable to pictorial renderings of maps in a graphical format; it is not applicable to retrieval of actual feature data or coverage data values.

2 Conformance

2.1 Conformance classes and requirements

This International Standard defines two conformance classes, one for a basic WMS, and the other for a queryable WMS. Each has two subclasses, one for clients and the other for servers.

2.2 Basic WMS

A basic WMS shall support the basic service elements (see Clause 6), the GetCapabilities operation (see 7.2), and the GetMap operation (see 7.3). To conform to this International Standard, a basic WMS shall satisfy the requirements of A.1 of the Abstract Test Suite in Annex A.

2.3 Queryable WMS

A queryable WMS shall satisfy all the requirements for a basic WMS, and shall also support the GetFeatureInfo operation (see 7.4). To conform to this International Standard, a queryable WMS shall satisfy all requirements of the Abstract Test Suite in Annex A.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8601:2004, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO 19111, *Geographic information — Spatial referencing by coordinates*

ISO 19115:2003, *Geographic information — Metadata*

EPSG (February 2003), *European Petroleum Survey Group Geodesy Parameters*, Lott, R., Ravanas, B., Cain, J., Simonson, G, and Nicolai, R., eds., available at *<http://www.epsg.org/>*

IETF RFC 2045 (November 1996), *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*, Freed, N. and Borenstein, N., eds., available at *<http://www.ietf.org/rfc/rfc2045.txt>*

IETF RFC 2396 (August 1998), *Uniform Resource Identifiers (URI): Generic Syntax*, Berners-Lee, T., Fielding, N., and Masinter, L., eds., available at *<http://www.ietf.org/rfc/rfc2396.txt>*

IETF RFC 2616 (June 1999), *Hypertext Transfer Protocol – HTTP/1.1*, Gettys, J., Mogul, J., Frystyk, H., Masinter, L., Leach, P., and Berners-Lee, T., eds., available at *<http://www.ietf.org/rfc/rfc2616.txt>*

UCUM, *Unified Code for Units of Measure*, Schadow, G. and McDonald, C.J. (eds.), version 1.5 *<http://aurora.regenstrief.org/UCUM/ucum.html>*

XML 1.0, *Extensible Markup Language (XML) 1.0*, World Wide Web Consortium Recommendation, Bray, T., Paoli, J., Sperberg-McQueen, C.M., and Maler, E., eds., available at *<http://www.w3.org/TR/>*

XML Schema, *XML Schema Part 1: Structures*, World Wide Web Consortium Recommendation, Thompson, H.S., Beech, D., Maloney, M., and Mendelsohn, N., eds., available at *<http://www.w3.org/TR/>*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1
client
software component that can invoke an **operation** from a **server**

4.2
coordinate reference system
coordinate system that is related to the real world by a datum

[ISO 19111]

4.3
coordinate system
set of mathematical rules for specifying how coordinates are to be assigned to points

[ISO 19111]

4.4
geographic information
information concerning phenomena implicitly or explicitly associated with a location relative to the Earth

[ISO 19101]

4.5
interface
named set of **operations** that characterize the behaviour of an entity

[ISO 19119]

4.6
layer
basic unit of **geographic information** that may be requested as a **map** from a **server**

4.7
map
portrayal of **geographic information** as a digital image file suitable for display on a computer screen

4.8
operation
specification of a transformation or query that an object may be called to execute

[ISO 19119]

4.9
portrayal
presentation of information to humans

[ISO 19117]

4.10
request
invocation of an **operation** by a **client**

4.11
response
result of an **operation** returned from a **server** to a **client**

4.12
server
a particular instance of a service

4.13
service
distinct part of the functionality that is provided by an entity through **interfaces**

[ISO 14252]

4.14
service metadata
metadata describing the **operations** and **geographic information** available at a **server**

5   Abbreviated terms

CDATA   XML Character Data

CRS   Coordinate Reference System

CS   Coordinate System

DCP   Distributed Computing Platform

DTD   Document Type Definition

EPSG   European Petroleum Survey Group

GIF   Graphics Interchange Format

GIS   Geographic Information System

HTTP   Hypertext Transfer Protocol

IANA   Internet Assigned Numbers Authority

IERS   International Earth Rotation Service

IETF   Internet Engineering Task Force

ITRF   International Terrestrial Reference Frame

ITRS   IERS Terrestrial Reference System

JPEG	Joint Photographic Experts Group
MIME	Multipurpose Internet Mail Extensions
NAD	North American Datum
OGC	Open GIS Consortium
PNG	Portable Network Graphics
RFC	Request for Comments
SVG	Scalable Vector Graphics
UCUM	Unified Code for Units of Measure
URL	Uniform Resource Locator
WebCGM	Web Computer Graphics Metafile
WCS	Web Coverage Service
WFS	Web Feature Service
WGS	World Geodetic System
WMS	Web Map Service
XML	Extensible Markup Language

6 Basic service elements

6.1 Introduction

This clause specifies aspects of Web Map Server behaviour that are independent of particular operations or are common to several operations.

6.2 Version numbering and negotiation

6.2.1 Version number form and value

The Web Map Service (WMS) defines a protocol version number. The version number applies to the XML schema and the request encodings defined in this International Standard. The version number contains three non-negative integers, separated by decimal points, in the form "$x.y.z$". The numbers "y" and "z" shall not exceed 99.

Implementations of this International Standard shall use the value "1.3.0" as the protocol version number.

6.2.2 Version number changes

The protocol version number shall be changed with each revision of this International Standard. The number shall increase monotonically and shall comprise no more than three integers separated by decimal points, with the first integer being the most significant. There may be gaps in the numerical sequence. Some numbers may denote draft versions. Servers and their clients need not support all defined versions, but shall obey the negotiation rules below.

6.2.3   Appearance in requests and in service metadata

The version number shall appear in at least two places: in the service metadata and in the parameter list of client requests to a server. The version number used in a client's request of a particular server shall be equal to a version number which that server has declared it supports (except during negotiation, as described below). A server may support several versions, whose values clients may discover according to the negotiation rules.

6.2.4   Version number negotiation

A WMS client may negotiate with a server to determine a mutually agreeable protocol version. Negotiation is performed using the GetCapabilities operation (described in 7.2) according to the following rules.

All service metadata shall include a protocol version number and shall comply with the XML DTD or Schema defined for that version. In response to a GetCapabilities request (for which the VERSION parameter is optional) that does not specify a version number, the server shall respond with the highest version it supports. In response to a GetCapabilities request containing a version number that the server implements, the server shall send that version. If the server does not support the requested version, the server shall respond with output that conforms to a version it does support, as determined by the following rules:

⎯ If a version unknown to the server and higher than the lowest supported version is requested, the server shall send the highest version it supports that is less than the requested version.

⎯ If a version lower than any of those known to the server is requested, then the server shall send the lowest version it supports.

⎯ If the client does not support the version sent by the server, it may either cease communicating with the server or send a new request with a different version number that the client does support.

The process may be repeated until a mutually understood version is reached, or until the client determines that it will not or cannot communicate with that particular server.

EXAMPLE 1   Server understands versions 1, 2, 4, 5 and 8. Client understands versions 1, 3, 4, 6, and 7. Client requests version 7. Server responds with version 5. Client requests version 4. Server responds with version 4, which the client understands, and the negotiation ends successfully.

EXAMPLE 2   Server understands versions 4, 5 and 8. Client understands version 3. Client requests version 3. Server responds with version 4. Client does not understand that version or any higher version, so negotiation fails and client ceases communication with that server.

The VERSION parameter is mandatory in requests other than GetCapabilities.

6.3   General HTTP request rules

6.3.1   Introduction

This International Standard defines the implementation of the WMS on a distributed computing platform (DCP) comprising Internet hosts that support the Hypertext Transfer Protocol (HTTP) (see IETF RFC 2616). Thus, the Online Resource of each operation supported by a server is an HTTP Uniform Resource Locator (URL). The URL may be different for each operation, or the same, at the discretion of the service provider. Each URL shall conform to the description in IETF RFC 2616 (section 3.2.2 "HTTP URL") but is otherwise implementation-dependent; only the query portion comprising the service request itself is defined by this International Standard.

HTTP supports two request methods: GET and POST. One or both of these methods may be offered by a server, and the use of the Online Resource URL differs in each case. Support for the GET method is mandatory; support for the POST method is optional.