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Web Map Context Documents

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Contents

i. Preface

This document is the result of work begun during the first and second Open GIS Consortium (OGC) Web Mapping Testbeds in 1999 and 2000 by IONIC Software and the US National Aeronautics and Space Administration (NASA) and demonstrated by IONIC in september 1999. At the OGC Technical Committee meeting in June 2002 work by Canada Center for Remote Sensing and NASA was demonstrated. This demonstration showed a map comprising layers from several distinct servers being built up in one Viewer Client, the creation of a platform-independent description of that map, the retrieval of that description by an entirely different Client, and the display of the map in the second Client. The ability to read and write Context documents have been included in the IONIC Client developed for the GISD-ICP client.

ii. Submitting Organizations

The following organizations submitted this Implementation Specification to the Open GIS Consortium Inc. as a Request For Comment (RFC):

a) Ionic Software (Belgium)

b) Canada Centre for Remote Sensing

c) US National Aeronautics and Space Administration

iii. Submission Contact Points

All questions regarding this submission should be directed to the Editor:

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iv. Revision History

Date	Release	Editor	Description
2000-05-05	0.1.0	Jeff de La Beaujardière Dimitri Monie	First draft proposed to WMT mailing list.
2000-06-27	0.1.2	Jeff de La Beaujardiere	Intermediate
2002-06-11	0.1.2	Jeff de La Beaujardière	Demonstration at OGC TC.
2002-06-25	0.1.3	Jean-Philippe Humblet	Intermediate
2002-08-19	0.1.4	Jean-Philippe Humblet	Discussion Paper #02-066
2002-08-28	0.1.4	Jean-Philippe Humblet	Revision #02-066r1: Added UML diagrams; fixed section numbering (Jeff DLB).

v. Changes to the OpenGIS Abstract Specification

The OpenGIS© Abstract Specification requires the following change to accommodate this OpenGIS© standard:

- The abstract concept of a persistent, reusable "context" for geospatial services should be added.

vi. Future work

Future work may include addition to the Context document to allow it to handle other data sources like WFS, WCS, WTS, … directly or through service chaining.

Foreword

Attention is drawn to the possibility that some of the elements of this part of OGC 02-066 may be the subject of patent rights. Open GIS Consortium Inc. shall not be held responsible for identifying any or all such patent rights.

Introduction

This document is a companion specification to the OpenGIS Web Map Service Interface Implementation Specification version 1.1.1 [4], hereinafter "WMS 1.1.1."

WMS 1.1.1 specifies how individual map servers describe and provide their map content. The present Context specification states how a specific grouping of one or more maps from one or more map servers can be described in a portable, platform-independent format for storage in a repository or for transmission between clients. This description is known as a "Web Map Context Document," or simply a "Context."

A Context document includes information about the server(s) providing layer(s) in the overall map, the bounding box and map projection shared by all the maps, sufficient operational metadata for Client software to reproduce the map, and ancillary metadata used to annotate or describe the maps and their provenance for the benefit of human viewers.

A Context document is structured using Extensible Markup Language (XML). Annex A of this specification contains the XMLSchema against which Context XML can be validated.

There are several possible uses for Context documents:

- The Context document can provide default startup views for particular classes of user. Such a document would have a long lifetime and public accessibility.

- The Context document can save the state of a viewer client as the user navigates and modifies map layers.

- The Context document can store not only the current settings but also additional information about each layer (e.g., available styles, formats, SRS, etc.) to avoid having to query the map server again once the user has selected a layer.

- The Context document could be saved from one client session and transferred to a different client application to start up with the same context.

Contexts could be cataloged and discovered, thus providing a level of granularity broader than individual layers.

Web Map Context Documents

1 Scope

This specification applies to the creation and use of documents which unambiguously describe the state, or "Context," of a WMS Client application in a manner that is independent of a particular client and that might be utilized by different clients to recreate the application state. This specification defines an encoding for the Context using Extensible Markup Language [XML 1.0].

This specification is relevant to Clients of the OGC Web Map Service [WMS 1.0, WMS 1.1.0, WMS 1.1.1]. Reference is made to normative material from [WMS 1.1.1]. In some cases, reference is made to normative material from the Styled Layer Descriptor specification [SLD]

This specification does not address the archival, cataloging, discovery or retrieval of Context XML documents.

2 Conformance

Conformance with this specification shall be checked using all the relevant tests specified in Annex D (normative).

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. However, parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

EPSG, *European Petroleum Survey Group Geodesy Parameters*, Lott, R., Ravanas, B., Cain, J., Girbig, J.-P., and Nicolai, R., eds., <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., <http://www.ietf.org/rfc/rfc2045.txt>

IETF RFC 2119 (March 1997), *Key words for use in RFCs to Indicate Requirement Levels*, Bradner, S., ed., <ftp://ftp.isi.edu/in-notes/rfc2119.txt>.

SLD 0.7.3 (April 2002), *Styled Layer Description (SLD) 0.7.3*, Open GIS Consortium Proposed Implementation Specification, Peter Vretanos, < http://www.opengis.org/techno/RFC14.pdf>

XML 1.0 (October 2000), *Extensible Markup Language (XML) 1.0 (2nd edition)*, World Wide Web Consortium Recommendation, Bray, T., Paoli, J., Sperberg-McQueen, C.M., and Maler, E., eds., <http://www.w3.org/TR/2000/REC-xml>

4 Terms and definitions

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

4.1
operation
specification of a transformation or query that an object may be called to execute [OGC AS 12]

4.2
interface
named set of **operations** that characterize the behavior of an entity [OGC AS 12]

4.3
service
distinct part of the functionality that is provided by an entity through **interfaces** [OGC AS 12]

4.4
service instance
server
actual implementation of a **service**

4.5
client
software component that can invoke an **operation** from a **server**

4.6
request
invocation of an **operation** by a **client**

4.7
response
result of an **operation** returned from a **server** to a **client**

4.8
map
pictorial representation of geographic data
NOTE: Need better term than "map" for stack of map layers forming a combined map described by a Context XML document.

4.9
spatial reference system
a projected or geographic coordinate reference system

4.10
Capabilities
service-level metadata describing the **operations** and content available at a **service instance**.

5 Conventions

5.1 Normative verbs

In the sections labeled as normative, the key words "**required**", "**shall**", "**shall not**", "**should**", "**should not**", "**recommended**", "**may**", and "**optional**" in this document are to be interpreted as described in [IETF RFC 2119].

The verb "**deprecate**" provides notice that the referenced portion of the specification is being retained for backwards compatibility with earlier versions but may be removed from a future version of the specification without further notice.

5.2 Abbreviated Terms

CGI	Common Gateway Interface
DCP	Distributed Computing Platform
DTD	Document Type Definition
EPSG	European Petroleum Survey Group
GIF	Graphics Interchange Format
GIS	Geographic Information System
GML	Geography Markup Language
HTTP	Hypertext Transfer Protocol
IETF	Internet Engineering Task Force
JPEG	Joint Photographic Experts Group
MIME	Multipurpose Internet Mail Extensions
OGC	Open GIS Consortium
OWS	OGC Web Service
PNG	Portable Network Graphics
RFC	Request for Comments
SLD	Styled Layer Descriptor
SVG	Scalable Vector Graphics
URL	Uniform Resource Locator
WebCGM	Web Computer Graphics Metafile
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service

XML Extensible Markup Language

6 Elements of a Context Document

The parent element of the WMS_Viewer_Context document includes as children a "General" element for layer-independent context and a **sequential** "LayerList" with specific details about each layer in use. The 'version' attribute specifies the Viewer Context specification revision to which this XMLSchema applies.

The General element provides layer-independent context information. It states the bounding box in units of a particular Spatial Reference System, as well as a Name and Title and an optional abstract.

The LayerList element encapsulates all the layers in the current context. One or more of those layers may be retained in the context but hidden from the display. LayerList contains a series of one or more Layer elements.

Each Layer element is nearly identical to that in WMS Capabilities. A few things are added, however, including information about the server providing that layer and the styles available.

The 'queryable' attribute is taken directly from the WMS Capabilities. The binary 'hidden' attribute, if present and nonzero, means to retain the layer in the file but not to display it for the user. The Viewer Client **should** provide a means for the user to detect that a hidden layer(s) exists and to show it if desired.

The Server element indicates the WMS from which this layer is retrieved. The ‘version’ attribute is taken from the WMT_MS_Capabilities/@version attribute of WMS Capabilities. The 'onlineResource' attribute is taken from the WMT_MS_Capabilities/Capability/Request/Map/DCPType/HTTP/Get/@onlineResource attribute.

The 'title' attribute is taken from the /WMT_MS_Capabilities/Service/Title/text() value.

The Name element of Layer gives the machine-readable name of this layer (as used in a GetMap request). The Title element is a human-readable title to briefly identify this layer in menus. The Abstract element provides a descriptive narrative for more information about this layer. The Keywords element contains short words to help catalog searching. Both Abstract and Keywords are retained to allow the UI to show the information to the user.

The SRS element is a listing of available Spatial Reference Systems (SRS) for this layer. One of these **must** be the particular SRS in use for this context, as stated in the General/BoundingBox/@SRS attribute.

LatLonBounding box is the minimum enclosing bounding box in geographic coordinates for this layer.

A StyleList element lists the Styles available for the enclosing Layer. Styles might be Named Styles from the WMT_MS_Capabilities/Capability/Layer/Style/@Name or remote SLD documents. In case of a named style, the Style element must contain a name and a title, the name by which a style is requested and a machine-readable title for menu lists, optionally (and ideally) provides a human-readable description, and optionally gives a legend URL. In case of an SLD style, Context document provides a link to the online resource where the SLD document can be found.

The 'current' attribute indicates whether this is the style currently selected by the user.

A Map Server **may** use zero or more LegendURL elements to provide an image of a legend relevant to each available Style of a Layer. An attribute indicates the media type of the legend; optional width and height are encouraged for image types to assist client applications in laying out space to display the legend.

The FormatList element lists available formats for this layer. Format values are taken from /WMT_MS_Capabilities/Capability/Request/Map/Format in WMS Capabilities. The attribute 'current' added in Context documents is nonzero for the format that is currently selected to display this layer.

6.1 Description of a Context

The Extensible Markup Language (XML) [XML 1.0] encoding of a Context document **shall** be valid according to the XMLSchema in annex A.1 of this document. This XMLSchema specifies the required and optional content of the Context document and how this document is formatted. Annex A.2 is an informative example of a Context XML document. Annex A.3 is an informative UML model of the Context document.

A Context document **may** reference an exact copy of the XMLSchema in annex A.1 of this document. The XMLSchema **shall** be located at a fully-qualified and accessible URL to permit XML validating process to retrieve it.

6.2 WMS_Viewer_Context

The root element of the context. This element must contain the version number of the Context Specification which the current Context document complies with.

The WMS_Viewer_Context is composed by two main elements, one for general information like contacts, Context title, … and the other describing the list of layers.

6.2.1 Version Number

The published specification version number contains three positive integers, separated by decimal points, in the form “x.y.z”. Each context specification is numbered independently.

6.3 General section

This section contains layer-independent information about the current Context document such as the bounding box and the spatial reference system and also some information describing the Context document itself such as title, abstract, etc.

6.3.1 Bounding Box and Spatial Reference System

The bounding box formatted as defined in the WMS 1.1 Specification. This element is mandatory.

6.3.2 Window Size

The size in pixel of the map the Context document describes. Negotiation between Context defined aspect ratio and typical client aspect ratio (according to client’s vendor) is left to the client. This element is optional.

6.3.3 Name

The name of the current Context document. This element is mandatory.

6.3.4 Title

The title of the Context. It should be human readable. This element is mandatory.

6.3.5 Keywords

A list of comma separated keywords allow search across context collections. This element is optional.

6.3.6 Abstract

An abstract for the Context document describing its content. This element is optional.

6.3.7 Contact Information

Contact information for the creator of the Context document. Contact is described as defined in WMS 1.1 Specification. This element is optional.

6.3.8 LogoURL

A reference to an image that might be attached to the Context document. It can be, for instance, the logo of the project for which the context has been setup, an overview of the map the context describes, …

This element contains an link to the image as well as the size of the image (in pixel) and its format.

This element is optional.

6.4 Layer List

The second half of a Context document is the layer list. This element describes the list of all layers to build the required view (map).

Each layer is defined in a <Layer> element in the Context document XML. A <LayerList> **shall** include at least one <Layer> element.

If desired, Layers may be repeated with different attributes (i.e. different styles).

6.4.1 Layer

Layers attributes are

- **hidden** : contains 1 if the layer should be hidden in the client result map
- **queryable** : contains 1 if the layer is set queryable for client side GetInfo action

The <Layer> element **must** enclose child elements providing information about the Layer. The meaning of these elements is defined hereunder.

6.4.2 Server

The element defining the service from where to request the Layer.

Attributes are :

- **Type** : the type of the server (according to OGC interfaces : WMS, WFS, …)
- **Version** : Version number of the OGC interface Specification the query might be build according to.
- **Title** : the title of the service (extracted from the Capabilities by the Context document creator)
- **Online Resource** element: the link to the online resource

This element is mandatory

6.4.3 Name

The name of the selected layer (extracted from Capabilities by the Context document creator).
This element is mandatory

6.4.4 Title

The title of the selected layer (extracted from Capabilities by the Context document creator).
This element is mandatory.

6.4.5 Abstract

The abstract of the selected layer (extracted from Capabilities by the Context document creator).
This element is optional.

6.4.6 Spatial Reference System

A list of available SRS for the enclosing layer. One of the listed SRS's must be the SRS mentioned in the WMT_Viewer_Context/General@SRS element.

6.4.7 DataURL

This element contains a link to the online resource where data describing the layer can be found.
This element is optional.

6.4.8 FormatList

The parent element containing the list of available image formats for this layer. Image formats **shall** be expressed with MIME types as described in WMS1.1 Specification.

Each image format is defined in a <Format>. A <FormatList> **shall** include at least one <Format> element.

6.4.9 Format

Describe one output image format for the Layer.
Attribute : “current” : contains 1 if the current image format is selected.

6.4.10 StyleList

The parent element containing the list of available styles for this layer.

Each style is defined in a <Style> element. A <StyleList> **shall** include at least one <Style> element.

6.4.11 Style

Attribute : current : contains 1 if the current style is selected.

A <Style> element may be composed in two different ways: named style or SLD (Styled Layer Descriptor).

6.4.11.1 Named Style description

Each named <Style> element **shall** have a <Name> and <Title> elements. The style name is used in the map request STYLE parameter. The title is a human-readable string.

Style element may also contain an <Abstract> element, that provide narrative description, and a <LegendURL> element that contains the location of an image of a map legend appropriate to the enclosing Style.

6.4.11.1.1 Name

The name of the style (extracted from Capabilities by the Context document creator). This element is mandatory.

6.4.11.1.2 Title

The human-readable title of the style (extracted from Capabilities by the Context document creator). This element is optional.

6.4.11.1.3 LegendURL

The location of an image of a map legend desribing the current style (extracted from Capabilities by the Context document creator). This element is optional.

6.4.11.1.4 Abstract

A narrative description of the current style (extracted from Capabilities by the Context document creator). This element is optional.

6.4.11.2 SLD

Each user-defined <Style> element **shall** have a <SLD> element.
The <SLD> element contains an <OnlineResource> element describing a link to the specified SLD document.

<OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple" xlink:href=”xxxxxxxxxxxxxxxxx”>

Annex A

A.1 Web Map Context Document XMLSchema (Normative)

This annex contains the Context XMLSchema definition corresponding to this version of the specification. The XMLSchema may also be found on-line at <http://www.ionicsoft.com/contexts/context_0_1_4.xsd>.

Comments are informative; in case of conflict with the main body of this specification the main body takes precedence.

```
<?xml version="1.0" encoding="UTF-8"?>
<!--W3C Schema generated by XML Spy v4.3 U (http://www.xmlspy.com)-->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:xlink="http://www.w3.org/TR/xlink"
elementFormDefault="qualified">
    <xs:import namespace="http://www.w3.org/TR/xlink" schemaLocation="xlink.xsd"/>
    <xs:element name="WMS_Viewer_Context" type="WMS_Viewer_ContextType"/>
    <xs:complexType name="WMS_Viewer_ContextType">
        <xs:sequence>
            <xs:element name="General" type="GeneralInfoType"/>
            <xs:element name="LayerList" type="LayerListType"/>
        </xs:sequence>
        <xs:attribute name="version" type="xs:string" use="required"/>
    </xs:complexType>
    <xs:complexType name="GeneralInfoType">
        <xs:sequence>
            <xs:element name="BoundingBox" type="BoundingBoxType"/>
            <xs:element name="Window" type="WindowType" minOccurs="0"/>
            <xs:element name="Title" type="xs:string"/>
            <xs:element name="Keywords" type="xs:string" minOccurs="0" maxOccurs="unbounded"/>
            <xs:element name="Abstract" type="xs:string"  minOccurs="0"/>
            <xs:element name="ContactInformation" type="ContactInformationType"  minOccurs="0"/>
            <xs:element name="LogoURL" type="LogoURLType" minOccurs="0"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="WindowType">
        <xs:attribute name="width" type="xs:integer" use="required"/>
        <xs:attribute name="height" type="xs:integer" use="required"/>
    </xs:complexType>
    <xs:complexType name="BoundingBoxType">
        <xs:attribute name="SRS" type="xs:string" use="required"/>
        <xs:attribute name="minx" type="xs:short" use="required"/>
        <xs:attribute name="miny" type="xs:byte" use="required"/>
        <xs:attribute name="maxx" type="xs:short" use="required"/>
        <xs:attribute name="maxy" type="xs:byte" use="required"/>
    </xs:complexType>
    <xs:complexType name="ContactInformationType">
        <xs:sequence>
            <xs:element name="ContactPersonPrimary" type="ContactPersonPrimaryType"/>
            <xs:element name="ContactPosition" type="xs:string"/>
            <xs:element name="ContactAddress" type="AddressType"/>
            <xs:element name="ContactVoiceTelephone" type="xs:string"/>
            <xs:element name="ContactFascimileTelephone" type="xs:string"/>
            <xs:element name="ContactElectronicMailAddress" type="xs:string"/>
        </xs:sequence>
```

```
    </xs:complexType>
    <xs:complexType name="LogoURLType">
        <xs:sequence>
            <xs:element name="OnlineResource" type="OnlineResourceType"/>
        </xs:sequence>
        <xs:attribute name="width" type="xs:integer" use="required"/>
        <xs:attribute name="height" type="xs:integer" use="required"/>
        <xs:attribute name="format" type="xs:string" use="required"/>
    </xs:complexType>
    <xs:complexType name="ContactPersonPrimaryType">
        <xs:sequence>
            <xs:element name="ContactPerson" type="xs:string"/>
            <xs:element name="ContactOrganization" type="xs:string"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="AddressType">
        <xs:sequence>
            <xs:element name="AddressType" type="xs:string"/>
            <xs:element name="Address" type="xs:string"/>
            <xs:element name="City" type="xs:string"/>
            <xs:element name="StateOrProvince" type="xs:string"/>
            <xs:element name="PostCode" type="xs:string"/>
            <xs:element name="Country" type="xs:string"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="LayerListType">
        <xs:sequence>
            <xs:element name="Layer" type="LayerType" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="LayerType">
        <xs:sequence>
            <xs:element name="Server" type="ServerType"/>
            <xs:element name="Name" type="xs:string"/>
            <xs:element name="Title" type="xs:string"/>
            <xs:element name="Abstract" type="xs:string" minOccurs="0"/>
            <xs:element name="DataURL" type="DataURLType" minOccurs="0"/>
            <xs:element name="SRS" type="xs:string" minOccurs="0"/>
            <xs:element name="FormatList" type="FormatListType" minOccurs="0"/>
            <xs:element name="StyleList" type="StyleListType" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="queryable" type="xs:boolean" use="required"/>
        <xs:attribute name="hidden" type="xs:boolean" use="required"/>
    </xs:complexType>
    <xs:complexType name="ServerType">
        <xs:sequence>
            <xs:element name="OnlineResource" type="OnlineResourceType"/>
        </xs:sequence>
        <xs:attribute name="service" type="xs:string"/>
        <xs:attribute name="version" type="xs:string" use="required"/>
        <xs:attribute name="title" type="xs:string" use="required"/>
    </xs:complexType>
    <xs:complexType name="DataURLType">
        <xs:sequence>
            <xs:element name="OnlineResource" type="OnlineResourceType"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="FormatListType">
        <xs:sequence>
            <xs:element name="Format" type="FormatType" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="FormatType">
```

```
        <xs:simpleContent>
            <xs:extension base="xs:string">
                <xs:attribute name="current" type="xs:boolean"/>
            </xs:extension>
        </xs:simpleContent>
    </xs:complexType>
    <xs:complexType name="StyleListType">
        <xs:sequence>
            <xs:element name="Style" type="StyleType" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="StyleType">
        <xs:choice>
            <xs:sequence>
                <xs:element name="Name" type="xs:string" minOccurs="0"/>
                <xs:element name="Title" type="xs:string" minOccurs="0"/>
                <xs:element name="LegendURL" type="LegendURLType" minOccurs="0"/>
            </xs:sequence>
            <xs:element name="SLD" type="SLDType" minOccurs="0"/>
        </xs:choice>
        <xs:attribute name="current" type="xs:boolean"/>
    </xs:complexType>
    <xs:complexType name="LegendURLType">
        <xs:sequence>
            <xs:element name="OnlineResource" type="OnlineResourceType"/>
        </xs:sequence>
        <xs:attribute name="width" type="xs:integer" use="required"/>
        <xs:attribute name="height" type="xs:integer" use="required"/>
        <xs:attribute name="format" type="xs:string" use="required"/>
    </xs:complexType>
    <xs:complexType name="SLDType">
        <xs:sequence>
            <xs:element name="OnlineResource" type="OnlineResourceType"/>
            <xs:element name="Title" type="xs:string" minOccurs="0"/>
        </xs:sequence>
    </xs:complexType>
    <xs:complexType name="OnlineResourceType">
        <xs:attributeGroup ref="xlink:simpleLink"/>
    </xs:complexType>
</xs:schema>
```

A.2 Web Map Context XML Example (Informative)

This annex contains a *sample* Context XML document. The example may also be found on-line at <http://www.ioniccsoft.com/contexts/context_0_1_4.xml >.

```
<?xml version="1.0" encoding="utf-8"?>
<WMS_Viewer_Context version="0.1.4" xmlns:xlink="http://www.w3.org/TR/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.ionicsoft.com/contexts/context_0_1_4.xsd">
    <General>
        <!-- Bounding box corners and spatial reference system -->
        <BoundingBox SRS="EPSG:4326" minx="-180" miny="-90" maxx="180" maxy="90"/>
        <!-- Title of Context -->
        <Title>EOS Data Gateways</Title>
        <!-- Keywords for search / find -->
        <Keywords>IMS,world maps,CEOS,EOSDIS,NASA,CCRS</Keywords>
```

```
        <!-- Abstract information -->
        <Abstract>Locations of Earth Observing System Data Gateways.  Search for and order earth science data
products from NASA and affiliated centers</Abstract>
        <!-- NOTE: optional info contact information mapped from WMS 1.1.0 spec (01-047r2) -->
        <ContactInformation>
            <ContactPersonPrimary>
                <ContactPerson>Bob Smith</ContactPerson>
                <ContactOrganization>Bob's Organisation</ContactOrganization>
            </ContactPersonPrimary>
            <ContactPosition>Systems Scientist</ContactPosition>
            <ContactAddress>
                <AddressType>postal</AddressType>
                <Address>Mac Arthur Drive, 523</Address>
                <City>Colma</City>
                <StateOrProvince>California</StateOrProvince>
                <PostCode>94015</PostCode>
                <Country>USA</Country>
            </ContactAddress>
            <ContactVoiceTelephone>+1 555 947 1828</ContactVoiceTelephone>
            <ContactFascimileTelephone>+1 555 947 2410</ContactFascimileTelephone>
            <ContactElectronicMailAddress>bob@organisation.com</ContactElectronicMailAddress>
        </ContactInformation>
    </General>
    <!--
 LayerList of Layer elements
 - implied order: bottomToTop
   first Layer element is bottom most layer in map view
   last  Layer element is top most layer in map view
-->
    <LayerList>
        <Layer queryable="0" hidden="0">
            <Server service="WMS" version="1.1.0" title="CCRS Spatial Data Warehouse">
                <OnlineResource xlink:type="simple"
xlink:href="http://ceoware2.ccrs.nrcan.gc.ca/cubewerx/cubeserv/cubeserv.cgi"/>
            </Server>
            <Name>ETOPO5:CEOWARE2</Name>
            <Title>Global 5 Minute Elevations</Title>
            <Abstract>ETOPO5 was generated from a digital data base of land and sea- floor elevations on a 5-minute
latitude/longitude grid. The resolution of the gridded data varies from true 5-minute for the ocean floors, the USA., Europe,
Japan,and Australia to 1 degree in data-deficient parts of Asia, South America, northern Canada, and Africa. Data sources
are as follows: Ocean Areas: US Naval Oceanographic Ofice; USA., W. Europe, Japan/Korea: US Defense Mapping
Agency; Australia: Bureau of Mineral Resources, Australia; New Zealand: Department of Industrial and Scientific
Research, New Zealand; balance of world land masses: US Navy Fleet Numerical Oceanographic Center. These various
data bases were originally assembled in 1988 into the worldwide 5-minute grid by Margo Edwards, then at Washington
University, St. Louis, MO.</Abstract>
            <DataURL>
                <OnlineResource xlink:type="simple" xlink:href="http://www.ngdc.noaa.gov/mgg/global/etopo5.HTML"/>
            </DataURL>
            <SRS>EPSG:4326</SRS>
            <FormatList>
                <Format current="1">image/gif</Format>
                <Format>image/png</Format>
                <Format>image/jpeg</Format>
            </FormatList>
            <StyleList>
                <Style current="1">
                    <Name>COLORMAP_ETOPO5</Name>
                    <Title>COLORMAP_ETOPO5</Title>
                    <LegendURL width="16" height="16" format="image/gif">
                        <OnlineResource xlink:type="simple"
xlink:href="http://ceoware2.ccrs.nrcan.gc.ca/cubewerx/cubeserv/cubeserv.cgi?VERSION=1.1.0&amp;REQUEST=GetLege
ndIcon&amp;LAYER=ETOPO5%3ACEOWARE2&amp;SPATIAL_TYPE=RASTER&amp;STYLE=COLORMAP_ETOPO5&
amp;FORMAT=image%2Fgif"/>
```

```
                    </LegendURL>
                </Style>
            </StyleList>
        </Layer>
        <Layer queryable="0" hidden="0">
            <Server version="1.0.7" title="The GLOBE Program Visualization Server">
                <OnlineResource xlink:type="simple" xlink:href="http://globe.digitalearth.gov/viz-bin/wmt.cgi"/>
            </Server>
            <Name>COASTLINES</Name>
            <Title>Coastlines</Title>
            <Abstract>Context layer: Coastlines</Abstract>
            <SRS>EPSG:4326</SRS>
            <FormatList>
                <Format current="1">image/gif</Format>
            </FormatList>
            <StyleList>
                <Style current="1">
                    <Name>default</Name>
                    <Title>Default</Title>
                    <LegendURL width="180" format="image/gif" height="50">
                        <OnlineResource xlink:type="simple"
xlink:href="http://globe.digitalearth.gov/globe/en/icons/colorbars/COASTLINES.gif"/>
                    </LegendURL>
                </Style>
                <Style>
                    <SLD>
                        <OnlineResource xlink:type="simple"
xlink:href="http://www.ionicsoft.com/services/SLDGenerator/01-04-1234534-98.sld"/>
                        <Title>mySLDDocument</Title>
                    </SLD>
                </Style>
            </StyleList>
        </Layer>
    </LayerList>
</WMS_Viewer_Context>
```

A.3 UML Models of Context Documents (informative)

This Annex contains UML diagrams that graphically represent the contents of a Context XML document. The model is separated into two diagrams for readability.

Figure A.1 - UML for WMS Context document

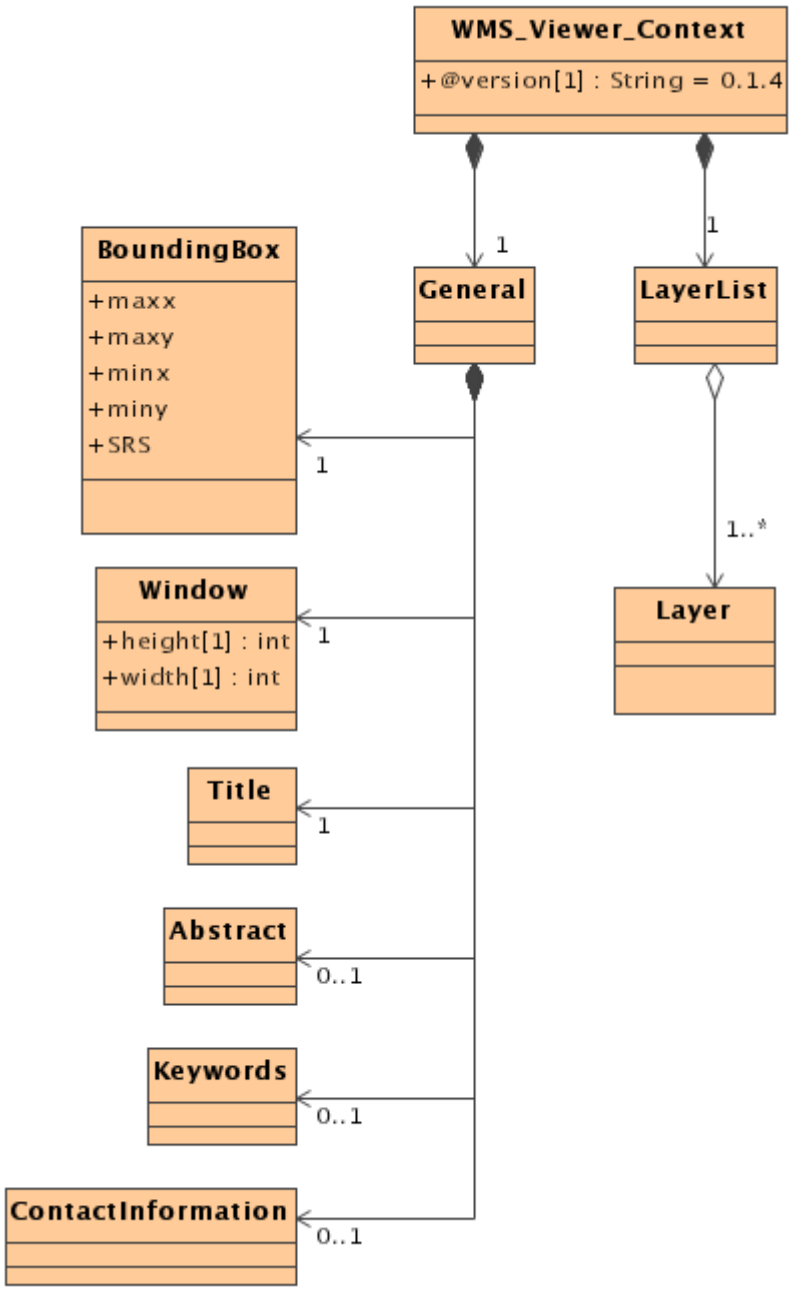

Figure A.2 - UML for Layer element in Context document