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Editors: Bill Woodward, Arliss Whiteside

Feature Portrayal Service

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This draft includes questions about what FPS abilities should be specified. These questions use blue text, like this paragraph. These questions need to be decided, the related text edited appropriately, and then these questions deleted from the completed document.

i.   Preface

This document specifies the interface to a Feature Portrayal Service, which is an OGC Web Service. This document is an Interoperability Program Report from the OGC Web Services Phase 3 (OWS-3) interoperability initiative.

Suggested additions, changes, and comments on this draft report are welcome and encouraged. Such suggestions may be submitted by email message or by making suggested changes in an edited copy of this document.

The changes made in this document version, relative to the previous version, are tracked by Microsoft Word, and can be viewed if desired. If you choose to submit suggested changes by editing this document, please first accept all the current changes, and then make your suggested changes with change tracking on.

ii.   Document terms and definitions

This document uses the specification terms defined in Subclause 5.3 of [OGC 05-008], 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 specification

iii.   Document contributor contact points

All questions regarding this document should be directed to the editor or the contributors:

Contact	Company
Arliss Whiteside	BAE Systems - Electronics & Integrated Solutions (E&IS)
Bill Woodward	ObjectFX Corporation
Jody Garnett	Refractions Research Inc.
Milan Trninic	Galdos Systems, Inc
Wesley Kubo	Galdos Systems, Inc
Richard Gould	Refractions Research Inc.
Craig Bruce	CubeWerx, Inc.
Stan Tillman	Intergraph Corporation

iv.   Revision history

Date	Release	Editor	Primary clauses modified	Description
2005-06-30	0.0.0	Arliss Whiteside	All	First draft
2005-11-22	0.0.30	Bill Woodward	All	Cleanup, final edit prior to submitting to pending docs

v.   Changes to the OpenGIS® Abstract Specification

The OpenGIS® Abstract Specification does not require changes to accommodate the technical contents of this document.

vi.   Future work

Improvements in this document are desirable to:

a)   Specify any additional operations that are needed, such as a GetLegendGraphic operation and/or a GetWSDL operation

b)   Add WSDL specification of this interface (in an Annex)

c)   Add UML model (in Annex D)

d)   Add Abstract test suite (in Annex A)

e)   Resolve open issues/questions as indicated by blue text.

Foreword

This document includes 4 annexes; Annexes A&B are normative, and Annexes C&D are informative.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The OGC shall not be held responsible for identifying any or all such patent rights.

Introduction

This document specifies the interface to a Feature Portrayal Service (FPS), which applies styles to digital features to produce a map image. The styles applied are identified or specified by the client, and are applied to digital feature data retrieved from a Web Feature Service (WFS) identified by the client.

This document contains information developed during OGC Web Services Phase 3 (OWS-3) interoperability initiative and is presented in the form of a draft FPS specification. It is anticipated that future working groups will take the information contained herein and move toward an implementable specification should such a FPS specification be desired by the OGC membership.

Feature Portrayal Service

1   Scope

This document specifies the interface to a Feature Portrayal Service, which applies styles to digital features to produce a map image. The styles applied are identified or specified by the client, and are applied to digital feature data retrieved from a Web Feature Service (WFS) identified by the client. The primary method to define a style to be used by a FPS is a Symbology Encoding document. Symbology Encodings are defined in OGC 05-112, Symbology_Management_DIPR.doc.

2   Conformance

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

3   Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this document. 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.

ISO 19105:2000, *Geographic information — Conformance and Testing*

Question: What other documents should be normatively referenced here? For example, what SLD document should be referenced?

OGC 05-010, *URNs of definitions in ogc namespace*

OGC 05-008, *OGC Web Services Common Specification*

OGC 05-112, *Symbology Management DIPR*

This OWS Common specification contains a list of normative references that are also applicable to this Implementation Specification.

In addition to this document, this specification includes several normative XML Schema files as specified in Annex B.

4   Terms and definitions

For the purposes of this specification, the definitions specified in Clause 4 of the OWS Common Implementation Specification [OGC 05-008] shall apply. In addition, the following terms and definitions apply.

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

portrayal
presentation of information to humans [ISO 19117]

symbology encoding
style description to apply to the digital features being rendered

5   Conventions

5.1   Abbreviated terms

Most of the abbreviated terms listed in Subclause 5.1 of the OWS Common Implementation Specification [OGC 05-008] apply to this document, plus the following abbreviated terms.

FPS   Feature Portrayal Service

SE   Symbology Encoding

SLD   Style Layer Descriptor

WFS   Web Feature Service

WMS   Web Mapping Service

5.2   UML notation

Most 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 05-008].

5.3   Used parts of other documents

This document uses significant parts of document [OGC 05-008]. To reduce the need to refer to that document, this document copies some of those parts with small modifications. To indicate those parts to readers of this document, the largely copied parts are shown with light grey background (15%).

5.4   Platform-neutral and platform-specific specifications

As specified in Clause 10 of OGC Abstract Specification Topic 12 "OpenGIS Service Architecture" (which contains ISO 19119), this document includes both Distributed

Computing Platform-neutral and platform-specific specifications. This document first specifies each operation request and response in platform-neutral fashion. This is done using a table for each data structure, which lists and defines the parameters and other data structures contained. These tables serve as data dictionaries for the UML model in Annex C, and thus specify the UML model data type and multiplicity of each listed item.

EXAMPLES 1   Platform-neutral specifications are contained in Subclauses TBD, and TBD.

The specified platform-neutral data could be encoded in many alternative ways, each appropriate to one or more specific DCPs. This document now specifies encoding appropriate for use of HTTP GET transfer of operations requests (using KVP encoding), and for use of HTTP POST transfer of operations requests (using XML or KVP encoding). However, the same operation requests and responses (and other data) could be encoded for other specific computing platforms, including SOAP/WSDL.

EXAMPLES 2   Platform-specific specifications for KVP encoding are contained in Subclauses TBD, and TBD.

EXAMPLES 3   Platform-specific specifications for XML encoding are contained in Subclauses TBD, and TBD.

6   Feature Portrayal Service overview

The specified Feature Portrayal Service (FPS) applies styles to digital features to produce a map-like image. The styles applied are identified or specified by the client, and are applied to digital feature data retrieved from a Web Feature Service (WFS) identified by the client.

The FPS interface (currently) specifies two operations that can be requested by a client and performed by a FPS server. Those operations are:

a)   GetPortrayal (required implementation by servers) – This operation allows a client to request and receive back styled digital feature data in a map-like image. The styles applied are identified or specified by the client, and are applied to digital feature data retrieved from a Web Feature Service (WFS) identified by the client.

b)   GetCapabilities (required implementation by servers) – This operation allows a client to request and receive back service metadata (or Capabilities) documents that describe the abilities of the specific server implementation. This operation also supports negotiation of the specification version being used for client-server interactions.

Question: What else or different should be said here about the GetPortrayal operation?

Question: Should any other FPS operations be specified in this Interoperability Program Report?

These operations have many similarities to other OGC Web Services, including to WMS. Many of these interface aspects that are common with other OWSs are thus specified in the OGC Web Services Common Implementation Specification [OGC 05-008]. Many of

these common aspects are normatively referenced herein, instead of being repeated in this specification.

Figure 1 is a simple UML diagram summarizing the FPS interface. This class diagram shows that the FPS interface class inherits the getCapabilities operation from the OGCWebService interface class, and adds the GetPortrayal operation. (This capitalization of names uses the OGC/ISO profile of UML.) A more complete UML model of the FPS interface is provided in Annex C (informative).

(A UML model is not now included in this FPS Interoperability Program Report.)

Figure 1 — FPS interface UML diagram

NOTE   In this UML diagram, the request and response for each operation is shown as a single parameter that is a data structure containing multiple lower-level parameters, which are discussed in subsequent clauses. The UML classes modelling these data structures are included in the complete UML model in Annex C.

Each of the two operations is described in more detail in subsequent clauses.

The encoding of operation requests shall use HTTP GET with KVP encoding and HTTP POST with XML and/or KVP encoding as specified in Clause 11 of [OGC 05-008]. Table 1 summarizes the FPS operations and their encoding methods defined in this specification.

Questions: Should HTTP POST use XML and/or KVP encoding?

Table 1 — FPS operation request encoding

Operation name	Request encoding
GetCapabilities (required)	KVP and optional XML
GetPortrayal (required)	XML and optional KVP

7   GetPortrayal operation (mandatory)

7.1   Introduction

The GetPortrayal operation allows FPS clients to request and receive back styled digital feature data in a map-like image. The styles applied are identified or specified by the client, and are applied to digital feature data retrieved from a Web Feature Service (WFS) identified by the client.

7.2   GetPortrayal operation request

7.2.1   GetPortrayal request parameters

A request to perform the GetPortrayal operation shall include the parameters listed and defined in Table 2. This table also specifies the UML model data type, source of values, and multiplicity of each listed parameter, plus the meaning to servers when each optional

parameter is not included in the operation request. Although some values listed in the "Name" column appear to contain spaces, they shall not contain spaces.

NOTE 1   To reduce the need for readers to refer to other documents, the first three parameters listed below are largely copied from Table 20 in Subclause 9.2.1 of [OGC 05-008]. The next two parameters listed below are adapted from Table 27 in Subclause 10.6 of that document.

Table 2 — Parameters in GetPortrayal operation request

Name [a]	Definition	Data type and value	Multiplicity and use
service	Service type identifier	Character String type, not empty Value is OWS type abbreviation, namely "FPS"	One (mandatory)
request	Operation name	Character String type, not empty Value is operation name , namely "GetPortrayal"	One (mandatory)
version	Specification version for operation	Character String type, not empty Value is specified by each Implementation Specification and Schemas version	One (mandatory)
OutputFormat	Reference to format in which operation output data should be encoded	MIME type, see Subclause 10.5 of [OGC 05-008] Values are specified in service metadata (Capabilities)	Zero or one (optional) Include when multiple output formats available, and desired format other than specified default, if any
BoundingBox	BoundingBox surrounding desired subset of features to be portrayed, in desired CRS [b, c]	ows:BoundingBox or ows:WGS84BoundingBox, see Subclause 10.2 of OGC 05-008	One (mandatory)
PortrayOutput	Specifies desired portrayal output detail	PortrayOutput type, see Table 3	One (mandatory)
SymbologyURL	Reference to Symbology Encoding document	URL (ows:OnlineResourceType in XML)	Zero or one (optional) If omitted, must include SymbologyEncoding parameter
SymbologyEncoding	Symbology encoding document contents	SymbologyEncoding document, see OGC 05-112	Zero or one (optional) if omitted, must provide SymbologyEncodingURL parameter
ChainRequest	Specifies chained OWS (most likely a WFS) from which to get data, plus how to get desired data	ChainRequest type, see Table 4	One (mandatory)
a The name capitalization rules being used here are specified in Subclause 11.6.2 of [OGC 05-008].			

b   In this application of ows:BoundingBox, the "crs" for that BoundingBox shall always be referenced and shall always have two axes (i.e., be 2D or two-dimensional). The CRS referenced in the BoundingBox shall be the desired CRS for this feature portrayal. Since the FPS does not perform coordinate conversion, this CRS identifier shall be passed on to the identified WFS to retrieve feature data in this CRS, within the BoundingBox specified in this CRS. This CRS shall be identified by a URN as specified in Clause 7 of [OGC 05-010], unless the referenced WFS does not support such URNs.

c   A FPS server should be able to portray data in any possible CRS. More specifically, a FPS server shall be able to portray data in both "left-handed" and "right-handed" CRSs, in which the (roughly) 90 degree angle from the first to the second axis can be either counter-clockwise or clockwise. See examples listed below.

Some examples of categories of CRSs that shall be correctly portrayed by a FPS server:

EXAMPLE 1 Geographic CRS using Latitude and Longitude axes, with coordinates listed in that order.

EXAMPLE 2 Geographic CRS using Longitude and Latitude axes, with coordinates listed in that order.

EXAMPLE 3 Projected CRS using Easting and Northing axes, with coordinates listed in that order.

EXAMPLE 4 Projected CRS using Northing and Easting axes, with coordinates listed in that order.

EXAMPLE 5 Projected CRS using axes with names and directions other than Easting and Northing.

NOTE 2   The data type of many parameters is specified as "Character String type, not empty". In the XML Schemas specified herein, these parameters are encoded with the xsd:string type, which does NOT require that these strings not be empty.

Table 3 — Parameters in PortrayOutput data structure

Name	Definition	Data type and values	Multiplicity and use
Width [a]	Width of desired output, in pixels	PositiveInteger type [b]	One (mandatory)
Height [a]	Height of desired output, in pixels	PositiveInteger type [b]	One (mandatory)
Transparent	Background transparency desired	Boolean type Values are "true" and "false" Default is true	Zero or one (optional) Include when opaque background desired
BackgroundColor	Background colour desired	CharacterString type, not empty Values are TBD	Zero or one (optional) Include when background colour desired
ExceptionFormat	Reference to format in which operation exceptions should be returned	CodeList type, either: "XML" "INIMAGE" "BLANK"	Zero or one (optional) Include when default XML not desired

a   The Width and Height parameters shall be applied to the two axes of the referenced "crs" of the specified BoundingBox. The Width shall be applied to the first axis of the BoundingBox "crs", and shall scale the BoundingBox size in that direction. Similarly, the Height shall be applied to the second axis of the BoundingBox "crs", and shall scale the BoundingBox size in that direction. (TBR)

b   The maximum value of Width and Height could be specified using a Constraint element in the Operation element in the OperationsMetadata section of the service metadata (Capabilities) document.

Table 4 — Parameters in ChainRequest data structure

Name	Definition	Data type and values	Multiplicity and use
RemoteOWS|Type	Identifier of service type from which to request data	Character String type, not empty Abbreviation of OWS type, such as WFS or WCS	One (mandatory)
RemoteOWS|URL	Reference to the specific OWS server from which to request data	URL (ows:OnlineResourceType in XML)	One (mandatory)
FeatureType	Reference to feature TypeName to be used to retrieve desired features from WFS	QName type, not empty	One (mandatory)
Filter	Filter used to specify which features to retrieve from WFS, to be used in request	ogc:Filter element, see FES 1.1 OGC 04-095	Zero or one (optional) Include when needed

The "Multiplicity and use" columns in Table 2 through Table 4 specify the optionality of each listed parameter and data structure in the GetPortrayal operation request. All the "mandatory" parameters and data structures shall be implemented by all FPS clients, using a specified value(s). Similarly, all the "mandatory" parameters and data structures shall be implemented by all FPS servers, checking that each request parameter or data structure is received with any specified value(s).

All the "optional" parameters and data structures, in the GetPortrayal operation request, shall also be implemented by all FPS servers, checking that each request parameter or data structure is received with any specified value(s). Similarly, all the "optional" parameters and data structures may be implemented by all FPS clients, using specified values.

7.2.2   GetPortrayal request KVP encoding (optional)

All FPS servers shall implement HTTP GET transfer of the GetPortrayal operation request, using KVP encoding. The KVP encoding of the GetPortrayal operation request shall use the parameters specified in NOTE 1 The first three rows in the following table are largely copied from Table 21 in OGC 05-008.

Table 5 shall be as specified in Table 2 above.

NOTE 1   The first three rows in the following table are largely copied from Table 21 in OGC 05-008.

Table 5 — GetPortrayal operation request URL parameters

Name and example [a]	Optionality and use	Definition and format
service=FPS	Mandatory	Service type identifier
request=GetPortrayal	Mandatory	Operation name
version=0.0.30	Mandatory	Specification and schema version for this operation
OutputFormat=image/png	Optional, include when multiple output formats available and desired format other than specified default, if any	MIME type of format in which output data should be encoded
BoundingBox=-180,-90,180,90,urn:ogc:def:crs:OGC:1.0:CRS84	Mandatory	BoundingBox surrounding desired subset of features to be portrayed, in desired CRS
OutputWidth=300	Mandatory	Positive integer pixel width of desired output
OutputHeight=300	Mandatory	Positive integer pixel height of desired output
Transparent=TRUE	Optional, include when opaque background desired	Boolean identifies when background transparency desired
BackgroundColor=0xFFFFFF	Optional, include when background colour desired	Code identifying background color desired
ExceptionFormat=BLANK	Optional, include when default XML not desired	Identifier of format in which operation exceptions should be returned
Symbology|URL= http://someotherserver.com/wfs/service.html	Mandatory [b]	Reference to Symbology Encoding document
RemoteOWS|Type=WFS	Mandatory	Identifier of service type from which to request data
RemoteOWS|URL = http://someotherserver.com/wfs/service.html	Mandatory	Reference to specific OWS server from which to request data
FeatureType= myns:lakes	Mandatory	Reference to feature TypeName to be used to retrieve desired features from WFS
Filter=TBD	Optional, include when needed	Filter used to specify which features to retrieve from WFS, to be used in request
NameSpace=TBD	Mandatory (TBR)	Identifier of namespace of FeatureType parameter [c]

a   All parameter names are here listed using mostly lower case letters. However, any parameter name capitalization shall be allowed in KVP encoding, see Subclause 11.5.2 of [OGC 05-008].

b   Inclusion of the SymbologyEncoding document is not allowed in a KVP encoded GetPortrayal operation request, so inclusion of the Symbology\|URL parameter is required.

c   Used to specify a namespace and its prefix. The format must be *xmlns(prefix=escaped_url)* where *escaped_url* is defined in Subclause 11.3 of [OGC 05-008]. If the prefix is not specified, then this is the default namespace.

7.2.3 GetPortrayal request XML encoding (mandatory)

FPS servers can implement HTTP POST transfer of the GetPortrayal operation request, using XML encoding only. The following schema fragment specifies the contents and structure of a GetPortrayal operation request encoded in XML:

7.3 Error! Not a valid filename. **GetPortrayal operation response**

7.3.1 Normal response parameters

The normal response to a valid GetPortrayal operation request shall be the features retrieved from the specified WFS server, symbolized using the referenced or included SymbologyEncoding, and portrayed as specified by the client.

Question: What else should be said here?

7.3.2 GetPortrayal exceptions

When a FPS server encounters an error while performing a GetPortrayal operation, it shall return an exception report message as specified in Subclause 7.4 of [OGC 05-008]. The allowed standard exception codes shall include those listed in Table 10. For each listed exceptionCode, the contents of the "locator" parameter value shall be as specified in the right column of Table 6.

NOTE   To reduce the need for readers to refer to other documents, the first three values listed below are copied from Table 20 in Subclause 8.3 of [OGC 05-008].

Table 6 — Exception codes for GetPortrayal operation

exceptionCode value	Meaning of code	"locator" value
MissingParameterValue	Operation request does not include a parameter value, and this server did not declare a default value for that parameter	Name of missing parameter
InvalidParameterValue	Operation request contains an invalid parameter value	Name of parameter with invalid value
NoApplicableCode	No other exceptionCode specified by this service and server applies to this exception	None, omit "locator" parameter

Question: What other exceptionCode value(s) should be listed here?

7.4 Examples

A FPS GetPortrayal operation request can look like this encoded in KVP:

```
http://someserver.com/fps/service.html?SERVICE=FPS&REQUEST=GetPortrayal
&VERSION=0.0.30&OUTPUTFORMAT=image/png&OUTPUTWIDTH=300&OUTPUTHEIGHT=300
&TRANSPARENT=FALSE&BACKGROUNDCOLOR=0xFFFFFF&EXCEPTIONFORMAT=BLank&SYMBO
LOGYURL=http://someotherserver.com/red.se&REMOTEOWSTYPE=WFS&REMOTEOWSUR
L=http://someotherserver.com/wfs/service.html &BOUNDINGBOX=-180,-
90,180,90,urn:ogc:def:crs:OGC:1.0:CRS84&FEATURETYPE=myns:lakes&NAMESPAC
E=xmlns(myns=http%3A%2F%2Fwww.example.com%2Fmyns)
```

A FPS GetPortrayal operation request can look like this encoded in XML:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<GetPortrayal xmlns="http://www.opengeospatial.net/fps"
    xmlns:ows="http://www.opengeospatial.net/ows"
    xmlns:ogc="http://www.opengis.net/ogc"
    xmlns:sld="http://www.opengis.net/sld"
    xmlns:se="http://www.opengeospatial.net/se"
    xmlns:gml="http://www.opengis.net/gml"
    xmlns:G="http://www.intergraph.com/geomedia/gml"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.opengeospatial.net/fps
        fpsGetPortrayal.xsd" service="FPS" version="0.0.30">
    <OutputFormat>image/png</OutputFormat>
    <ows:BoundingBox crs="urn:ogc:def:crs:EPSG:6.6:4326">
        <ows:LowerCorner>-116.860 32.857</ows:LowerCorner>
        <ows:UpperCorner>-116.25 33.4</ows:UpperCorner>
    </ows:BoundingBox>
    <PortrayOutput>
        <Width>700</Width>
        <Height>500</Height>
        <Transparent>true</Transparent>
        <BackgroundColor>0xFFFFFF</BackgroundColor>
        <ExceptionFormat>XML</ExceptionFormat>
    </PortrayOutput>
     <SymbologyURL xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
     xlink:href="http://localhost:8080/OWS3/encodings/EvacSchools-2525B-
SE.xml"/>
    <ChainRequest>
        <RemoteOWSType>WFS</RemoteOWSType>
         <RemoteOWSURL xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
xlink:href="http://regis.intergraph.com/wfs/casil/request.asp" />
        <FeatureType>schoolsa</FeatureType>
    </ChainRequest>
</GetPortrayal>
```

8   GetCapabilities operation (mandatory)

8.1   Introduction

The mandatory GetCapabilities operation allows clients to retrieve service metadata from a server. The response to a GetCapabilities request shall be an XML document containing service metadata about the server. This clause specifies the XML document that a FPS server must return to describe its capabilities.

8.2   Operation request

The GetCapabilities operation request shall be as specified in Subclauses 7.2.2 through 7.2.4 of [OGC 05-008]. The value of the "service" parameter shall be "FPS". The

allowed set of service metadata (or Capabilities) XML document section names and meanings shall be as specified in Tables 3 and 7 of [OGC 05-008], omitting the Contents section.

Question: Is there really no need to provide any styling ability information in the metadata about a FPS server?

The "Multiplicity and use" column in Table 1 of [OGC 05-008] specifies the optionality of each listed parameter in the GetCapabilities operation request. Table 7 specifies the implementation of those parameters by FPS clients and servers.

Table 7 — Implementation of parameters in GetCapabilities operation request

Name	Multiplicity	Client implementation	Server implementation
service	One (mandatory)	Each parameter shall be implemented by all clients, using specified value	Each parameter shall be implemented by all servers, checking that each parameter is received with specified value
request	One (mandatory)		
Accept‖Versions	Zero or one (optional)	Should be implemented by all software clients, using specified values	Shall be implemented by all servers, checking if parameter is received with specified value(s)
Sections	Zero or one (optional) [b]	Each parameter may be implemented by each client [b]	Each parameter may be implemented by each server [a]
update‖Sequence	Zero or one (optional) [b]	If parameter not provided, shall expect default response	If parameter not implemented or not received, shall provide default response
Accept‖Formats	Zero or one (optional) [b]	If parameter provided, shall allow default or specified response	If parameter implemented and received, shall provide specified response
[a] A specific OWS is allowed to make mandatory server implementation of any of these three parameters.			
[b] If a specific OWS makes mandatory server implementation of any of these three parameters, that parameter can also be made mandatory in the operation request, also requiring client implementation of this parameter.			

NOTE   The "Sections" and "updateSequence" parameters were not implemented in FPS servers in OWS-3.

Question: Should FPS server or client implementation of any parameters in the GetCapabilities operation request be different that stated in Table 7?

All FPS servers shall implement HTTP GET transfer of the GetCapabilities operation request, using KVP encoding. Servers can also implement HTTP POST transfer of the GetCapabilities operation request, using XML encoding only.

Question: Should FPS server implementation of HTTP POST transfer of KVP encoded GetCapabilities operation requests be optional, prohibited, or required?

11

8.3 GetCapabilities operation response

8.3.1 Normal response

The service metadata document shall contain the three sections specified in Table 8. Depending on the values in the Sections parameter of the GetCapabilities operation request, any combination of these sections can be requested and returned.

NOTE   The following table is largely copied from Table 7 in OGC 05-008.

Table 8 — Section name values and contents

Section name	Contents
ServiceIdentification	Metadata about this specific server. The schema of this section shall be the same as for all OWSs, as specified in Subclause 7.4.3 and owsServiceIdentification.xsd of [OGC 05-008].
ServiceProvider	Metadata about the organization operating this server. The schema of this section shall be the same for all OWSs, as specified in Subclause 7.4.4 and owsServiceProvider.xsd of [OGC 05-008].
OperationsMetadata	Metadata about the operations specified by this service and implemented by this server, including the URLs for operation requests. The basic contents and organization of this section shall be the same as for all OWSs, as specified in Subclause 7.4.5 and owsOperationsMetadata.xsd of [OGC 05-008].

In addition to these sections, each service metadata document shall include the mandatory "version" and optional updateSequence parameters specified in Table 6 in Subclause 7.4.1 of [OGC 05-008].

8.3.2 OperationsMetadata section standard contents

For the FPS, the OperationsMetadata section shall be the same (TBD) as for all OGC Web Services, as specified in Subclause 7.4.5 and owsOperationsMetadata.xsd of [OGC 05-008]. The mandatory values of various (XML) attributes shall be as specified in Table 9. In Table 9, the "Attribute name" column uses dot-separator notation to identify parts of a parent item. The "Attribute value" column references an operation parameter, in this case an operation name, and the meaning of including that value is listed in the right column.

Table 9 — Required values of OperationsMetadata section attributes

Attribute name	Attribute value	Meaning of attribute value
Operation.name	GetCapabilities	The GetCapabilities operation is implemented by this server.
	GetPortrayal	The GetPortrayal operation is implemented by this server.

In addition to the required values listed in Table 5, there are many optional values of the "name" attributes and "value" elements in the OperationsMetadata section, which can be included when considered useful. Most of these attributes and elements are for recording the domains of various parameters and quantities.

EXAMPLE 1   The domain of the exceptionCode parameter could record all the codes implemented for each operation by that specific server. Similarly, each of the GetCapabilities operation optional request parameters might have its domain recorded.

EXAMPLE 2 The domain of the OutputFormat parameter, in the GetPortrayal operation request, could identify all the data output formats supported by this FPS server.

EXAMPLE 3 The domain of the AcceptFormats parameter, in the GetCapabilities operation request, could identify all the capabilities formats supported by this FPS server.

EXAMPLE 4 The domain of a RemoteOWSTypeAndVersion constraint, for the GetPortrayal operation request, could identify all the combinations of RemoteOWSType values and the corresponding remote OWS server versions supported by this FPS server.

8.3.3   Capabilities document XML encoding

A XML Schema fragment for a FPS service metadata document uses ows:CapabilitiesBaseType in owsCommon.xsd of [OGC 05-008], and is:

Error! Not a valid filename. This XML Schema uses the owsServiceIdentification.xsd, owsServiceProvider.xsd, and owsOperationsMetadata.xsd schemas specified in [OGC 05-008]. All these XML Schemas contain documentation of the meaning of each element, attribute, and type, and this documentation shall be considered normative as specified in Subclause 11.6.3 of [OGC 05-008].

8.3.4   Exceptions

When a FPS server encounters an error while performing a GetCapabilities operation, it shall return an exception report message as specified in Clause 8 of [OGC 05-008]. The allowed exception codes shall include those listed in Table 5 of Subclause 7.4.1 of [OGC 05-008], if the updateSequence parameter is implemented by the server.

8.4   Examples

To request a capabilities document, a client could issue the following GetCapabilities operation request with minimum contents:

```
http://localhost:8080/OWS3/fps&SERVICE=FPS&REQUEST=getCapabilities
```

The corrsponding minimum request encoded in XML is:

Error! Not a valid filename.
In response to such a request, the FPS server might generate a document that looks like:

<p style="color:red">Error! Not a valid filename.</p>**Annex A**
(normative)

Abstract test suite

(No abstract test suite is included in this WFS Interoperability Program Report.).

Annex B
(normative)

XML schemas

In addition to this document, this specification includes several normative XML Schema files. These XML Schema files are bundled in a zip file with the present document. After OGC acceptance of a Version 1.0.0 of this specification, these XML Schemas will also be posted online at the URL http://schemas.opengeospatial.net/FPS/1.0.0. In the event of a discrepancy between the bundled and online versions of the XML Schema files, the online files shall be considered authoritative.

The FPS abilities now specified in this document use TBD specified XML Schemas included in the zip file with this document. These XML Schemas combine the XML Schema fragments listed in various subclauses of this document, eliminating duplications. These XML Schema files roughly match the TBD UML packages described in Annex B, and are named:

> fpsGetPortrayal.xsd
>
> fpsGetCapabilities.xsd

These XML Schemas use and build on the OWS common XML Schemas specified [OGC 05-008], named:

> ows19115subset.xsd
>
> owsCommon.xsd
>
> owsDataIdentification.xsd
>
> owsGetCapabilities.xsd
>
> owsOperationsMetadata.xsd
>
> owsServiceIdentification.xsd
>
> owsServiceProvider.xsd
>
> owsExceptionReport.xsd

All these XML Schemas contain documentation of the meaning of each element and attribute, and this documentation shall be considered normative as specified in Subclause 11.6.3 of [OGC 05-008].

Annex C
(informative)

UML model

(No UML model of the FPS interface is now included in this Interoperability Program Report)

Annex D
(informative)

Example XML documents

D.1   Introduction

This annex provides more example XML documents than given in the body of this document.

D.2   No additional Example XML documents are included at this time

Bibliography

[1]   Guidelines for Successful OGC Interface Specifications, OGC document 00-014r1

Question: What informative references should be listed here?