

ISO 19142:2010-12 (E)

Geographic information - Web Feature Service

Contents		Page
Foreword		xi
Introduction		xii
1	Scope	1
2	Conformance	2
3	Normative references	3
4	Terms and definitions	4
5	Conventions	8
5.1	Abbreviated terms	8
5.2	Use of examples	9
5.3	XML schemas	9
5.4	UML Notation	9
5.4.1	Class diagrams	9
5.4.2	State machine notation	10
6	Basic service elements	11
6.1	Introduction	11
6.2	Version numbering and negotiation	11
6.2.1	Version number form and value	11
6.2.2	Appearance in service metadata and in requests	11
6.2.3	Version number negotiation	11
6.2.4	Request encoding	11
6.2.5	KVP parameter encoding rules	12
6.3	Namespaces	13
6.4	Service bindings	13
7	Common elements	13
7.1	Encoding of features	13
7.2	Resource identifiers	13
7.2.1	Assigning resource identifiers	13
7.2.2	Encoding resource identifiers	14
7.2.3	Version identification	14
7.3	Property references	14
7.3.1	XPath subset	14
7.3.2	Accessor function	14
7.4	Predicate expression encoding	15
7.5	Exception reporting	15
7.6	Common request parameters	17
7.6.1	Introduction	17
7.6.2	Base request type	17
7.6.3	Standard presentation parameters	19
7.6.4	Standard resolve parameters	22
7.6.5	Standard input parameters	25
7.6.6	Additional common keywords for KVP-encoded requests	26
7.7	Standard response parameters	27
7.7.1	Parameter semantics	27
7.7.2	XML encoding	27

7.7.3	KVP encoding	27
7.7.4	Parameter discussion	27
7.8	Use of the schemaLocation attribute	30
7.9	Query expressions	30
7.9.1	Introduction	30
7.9.2	Ad hoc query expression	30
7.9.3	Stored query expression	40
8	GetCapabilities operation	42
8.1	Introduction	42
8.2	Request	43
8.2.1	Request semantics	43
8.2.2	XML encoding	43
8.2.3	KVP encoding	43
8.3	Response	43
8.3.1	Response semantics	43
8.3.2	XML encoding	44
8.3.3	Capabilities document	45
8.3.4	FeatureTypeList section	45
8.3.5	Parameters domains and constraints	48
8.4	Extension points	52
8.5	Exceptions	54
9	DescribeFeatureType operation	54
9.1	Introduction	54
9.2	Request	54
9.2.1	Request semantics	54
9.2.2	XML Encoding	54
9.2.3	KVP Encoding	55
9.2.4	Parameter discussion	55
9.3	Response	56
9.3.1	Introduction	56
9.3.2	Supporting multiple namespaces	56
9.4	Exceptions	57
10	GetPropertyValue operation	57
10.1	Introduction	57
10.2	Request	57
10.2.1	Request semantics	57
10.2.2	XML Encoding	58
10.2.3	KVP Encoding	58
10.2.4	Parameter discussion	58
10.3	Response	60
10.3.1	Response semantics	60
10.3.2	XML encoding	60
10.3.3	State parameter	61
10.3.4	Standard response parameters	61
10.4	Exceptions	61
11	GetFeature operation	62
11.1	Introduction	62
11.2	Request	62
11.2.1	Request semantics	62
11.2.2	XML encoding	63
11.2.3	KVP encoding	63
11.2.4	Parameter discussions	64
11.3	Response	64
11.3.1	Response semantics	64
11.3.2	XML encoding	65
11.3.3	Parameter discussions	66
11.3.4	Additional objects	69
11.3.5	GetFeatureById response	69

11.4	Exceptions	70
12	LockFeature operation	70
12.1	Introduction	70
12.2	Request	70
12.2.1	Request semantics	70
12.2.2	XML encoding	71
12.2.3	KVP encoding	71
12.2.4	Parameter discussions	72
12.2.5	State machine for WFS locking	73
12.3	Response	74
12.3.1	Response semantics	74
12.3.2	XML encoding	74
12.4	Exceptions	75
13	GetFeatureWithLock operation	75
13.1	Introduction	75
13.2	Request	75
13.2.1	Request semantics	75
13.2.2	XML encoding	75
13.2.3	KVP encoding	76
13.2.4	Parameter discussion	76
13.3	Response	77
13.3.1	Introduction	77
13.3.2	lockId parameter	77
13.4	Exceptions	77
14	Stored query management	77
14.1	Introduction	77
14.2	Defining stored queries	78
14.2.1	XML encoding	78
14.2.2	Parameter discussion	78
14.3	ListStoredQueries operation	81
14.3.1	Request semantics	81
14.3.2	XML encoding	82
14.3.3	KVP encoding	82
14.3.4	Response	82
14.3.5	Exceptions	83
14.4	DescribeStoredQueries operations	83
14.4.1	Request semantics	83
14.4.2	XML encoding	83
14.4.3	KVP encoding	84
14.4.4	Response	84
14.5	CreateStoredQuery operation	85
14.5.1	Request semantics	85
14.5.2	XML encoding	85
14.5.3	KVP encoding	85
14.5.4	Parameter discussions	85
14.5.5	Response	86
14.6	DropStoredQuery operations	86
14.6.1	Request semantics	86
14.6.2	XML encoding	87
14.6.3	KVP encoding	87
14.6.4	Response	87
14.7	Exceptions	87
15	Transaction operation	88
15.1	Introduction	88
15.2	Request	88
15.2.1	Request semantics	88
15.2.2	XML encoding	89
15.2.3	Parameter discussions	90

15.2.4	Insert action	91
15.2.5	Update action	92
15.2.6	Replace action	94
15.2.7	Delete action	94
15.2.8	Native action	95
15.3	Response	96
15.3.1	Response semantics	96
15.3.2	TransactionResponse element	96
15.3.3	TransactionSummary element	97
15.3.4	InsertResults element	97
15.3.5	UpdateResults element	98
15.3.6	ReplaceResults element	98
15.4	Exceptions	98
Annex A (normative) Conformance testing		99
A.1	Conformance classes	99
A.1.1	Simple WFS	99
A.1.2	Basic WFS	99
A.1.3	Transactional WFS	99
A.1.4	Locking WFS	100
A.1.5	HTTP GET	100
A.1.6	HTTP POST	100
A.1.7	SOAP	100
A.1.8	Inheritance	101
A.1.9	Remote resolve	101
A.1.10	Response paging	101
A.1.11	Standard joins	101
A.1.12	Spatial joins	101
A.1.13	Temporal joins	102
A.1.14	Feature versions	102
A.1.15	Manage stored queries	102
A.2	Basic tests	102
A.2.1	Version negotiation	102
A.2.2	Lists version number 2.0.0 as a supported request version number	103
A.2.3	Invalid version number	103
A.2.4	Version negotiation for the GetCapabilities request	103
A.2.5	Response to XML- and KVP-encoded requests	103
A.2.6	Parameter ordering and case	104
A.2.7	Unrecognized parameters	104
A.2.8	Server operates on GML features	104
A.2.9	Feature identifiers	105
A.2.10	Invariant identifier	105
A.2.11	Versioning	105
A.2.12	XPath subset	106
A.2.13	Predicate encoding	106
A.2.14	Exception reporting	106
A.2.15	Common request parameters	107
A.2.16	Standard presentation parameters	108
A.2.17	Standard resolve parameters	109
A.2.18	Standard input parameters	112
A.2.19	Standard response parameters	113
A.2.20	Response paging	114
A.2.21	schemaLocation parameter	115
A.2.22	Query expressions	115
A.2.23	Declaring conformance	120
Annex B (informative) Examples		121
B.1	Exception report example	121
B.2	DescribeFeatureType examples	121
B.2.1	Example 1	121

B.2.2	Example 2	124
B.3	GetFeature examples	128
B.3.1	Introduction	128
B.3.2	Example 1	128
B.3.3	Example 2	128
B.3.4	Example 3	129
B.3.5	Example 4	129
B.3.6	Example 5	131
B.3.7	Example 6	131
B.3.8	Example 7	131
B.3.9	Example 8	132
B.3.10	Example 9	134
B.3.11	Example 10	136
B.3.12	Example 11	137
B.3.13	Example 12	138
B.3.14	Example 13	139
B.3.15	Example 14	142
B.3.16	Example 15	143
B.3.17	Example 16	143
B.3.18	Example 17	144
B.3.19	Example 18	145
B.3.20	Example 19	145
B.4	GetPropertyValue examples	146
B.4.1	Introduction	146
B.4.2	Example 1	147
B.4.3	Example 2	149
B.4.4	Example 3	149
B.4.5	Example 4	151
B.4.6	Example 5	152
B.4.7	Example 6	153
B.4.8	Example 7	154
B.4.9	Example 8	154
B.4.10	Example 9	155
B.5	LockFeature examples	156
B.5.1	Example 1	156
B.5.2	Example 2	157
B.5.3	Example 3	157
B.5.4	Example 4	158
B.6	Transaction examples	159
B.6.1	Insert example	159
B.6.2	Update examples	160
B.6.3	Delete examples	162
B.6.4	Mixed transaction example	163
B.6.5	Transaction response example	166
B.7	GetCapabilities example	167
B.8	KVP examples	182
B.8.1	Conventions	182
B.8.2	DescribeFeatureType examples	182
B.8.3	GetPropertyValue examples	183
B.8.4	GetFeature examples	185
B.8.5	LockFeature examples	190
Annex C (informative) Consolidated XML schema		192
C.1	Introduction	192
C.2	wfs.xsd	192
Annex D (normative) Service bindings		203
D.1	Introduction	203
D.2	HTTP GET and POST binding	203
D.3	HTTP status codes	203

D.4	SOAP binding	204
D.4.1	Introduction	204
D.4.2	SOAP Envelope	205
D.4.3	SOAP Header	205
D.4.4	SOAP Body	205
D.4.5	Encoding XML Schema in a SOAP Body	206
D.4.6	SOAP Fault	207
D.4.7	SOAP HTTP Binding	208
Annex E (normative) Web Service Description Language (WSDL)		209
E.1	Introduction	209
E.2	WFS Operations in WSDL	209
E.3	SOAP Binding	209
E.4	Binding style	210
E.5	Service	211
E.6	Service description using WSDL	211
E.6.1	Introduction	211
E.6.2	wfs-xml-interfaces.wsdl	211
E.6.3	wfs-kvp-interfaces.wsdl	213
E.6.4	wfs-responses.wsdl	215
E.6.5	wfs-http-bindings.wsdl	215
E.6.6	wfs-kvp-bindings.wsdl	218
E.6.7	wfs-soap-bindings.wsdl	219
E.6.8	Ancillary files	221
E.6.9	Examples (informative)	226
Annex F (informative) Abstract model		229
F.1	Overview	229
F.2	Abstract Resource Model	229
F.2.1	Introduction	229
F.2.2	Basic Accessor Functions	229
F.3	Mapping of the General Feature Model (GFM) to the WFS Abstract Model	231
F.4	Identifiers	231
F.5	valueOf() function	231
F.6	WFS Operations	231
F.6.1	Introduction	231
F.6.2	featureTypeNameList() function	232
F.6.3	featureType() function	232
F.6.4	Query function	232
F.6.5	propertyValue() function	233
F.6.6	lock() function	234
F.6.7	transaction() function	234
F.6.8	Stored query operations	235
F.7	WFS Operations	236
F.8	Conceptual schema	236
Bibliography		238
Figures Figure 1 -- UML notation in class diagrams		9
Figure 2 -- Summary of UML state diagram notations		10
Figure 3 -- BaseRequest		17
Figure 4 -- StandardPresentationParameters		19
Figure 5 -- StandardResolveParameters		22
Figure 6 -- StandardInputParameters		25

Figure 7 -- StandardResponseParameters	27
Figure 8 -- Ad hoc query expression	31
Figure 9 -- Query projection clause	35
Figure 10 -- Query sorting clause	39
Figure 11 -- StoredQuery	41
Figure 12 -- GetCapabilities request	43
Figure 13 -- GetCapabilities response	44
Figure 14 -- DescribeFeatureType request	54
Figure 15 -- GetPropertyValue request	57
Figure 16 -- GetPropertyValue response	60
Figure 17 -- GetFeature request	63
Figure 18 -- GetFeature response	65
Figure 19 -- LockFeature request	70
Figure 20 -- State diagram for a WFS lock	73
Figure 21 -- LockFeature response	74
Figure 22 -- GetFeatureWithLock request	75
Figure 23 -- ListStoredQueries request	81
Figure 24 -- ListStoredQueriesResponse	82
Figure 25 -- DescribeStoredQueries request	83
Figure 26 -- DescribeStoredQueriesResponse	84
Figure 27 -- CreateStoredQuery request	85
Figure 28 -- CreateStoredQuery response	86
Figure 29 -- DropStoredQuery request	86
Figure 30 -- Transaction request	89
Figure 31 -- Transaction response	96
Figure F.1 -- Web Feature Service interfaces overview	237
Tables Table 1 -- Conformance Classes	2
Table 2 -- Operation request encoding	12
Table 3 -- WFS exception codes	16
Table 4 -- KVP encoding of the base request type	18
Table 5 -- KVP encoding of standard presentation parameters	19

Table 6 -- KVP encoding of standard resolve parameters	23
Table 7 -- Additional common keywords for KVP-encoded. WFS requests	26
Table 8 -- Keywords for Ad hoc query KVP encoding	32
Table 9 -- KVP encoding of projection clause	35
Table 10 -- Keywords for Stored query KVP encoding	41
Table 11 -- Elements to describe feature types	47
Table 12 -- Parameter domains for WFS operations	48
Table 13 -- Service constraints	50
Table 14 -- Operation Constraints	51
Table 15 -- DescribeFeatureType KVP encoding	55
Table 16 -- Keywords for GetPropertyValue KVP encoding	58
Table 17 -- Keywords for GetFeature KVP encoding	64
Table 18 -- Keywords for LockFeature KVP encoding	71
Table 19 -- Additional keywords for GetFeatureWithLock KVP encoding	76
Table 20 -- Keywords for ListStoredQueries KVP encoding	82
Table 21 -- Keywords for DescribeStoredQueries KVP encoding	84
Table 22 -- Keywords for DropStoredQuery KVP encoding	87
Table D.1 -- Request encoding and transport methods	203
Table D.2 -- Correlate OWS and WFS exception codes to HTTP status codes	204
Table F.1 -- Mapping the WFS Abstract Model operations to WFS operations	236