DGIWG 125

Defence Profile of OGC's Catalogue Service for the Web 2.0

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Executive Summary

This standard defines a military implementation profile for the OpenGIS Catalogue Services specification 2.0.2 with the ISO 19115/19119 Metadata Application Profile to enable interoperable discovery of resources (e.g. geospatial datasets and services) within a multi-national coalition. The intention of the profile is to maximize interoperability specifically in a military context by mandating a minimum set of service Requirements and metadata necessary to improve usability in an operational coalition environment.

The Open Geospatial Consortium defines an overall catalogue service specification, with two specific application profiles aimed at simple and complex cataloguing Requirements.

The OGC Catalogue Service standard consist of:

- The Core CSW Catalogue Specification (uses a subset of Dublin core metadata)
- The CSW 19115/119 Application Profile (a simple catalogue option)
- The CSW ebRIM Application Profile (a more advanced catalogue/registry option).

OGC has finished the work on a CSW 3.0 in 2016. Based on the current level of CSW 3.0 implementations and the outcome of the DGIWG CSW questionnaire, the DGIWG Web Service Technical Panel (WSTP) has determined a profile of CSW 2.0.2 based on ISO 19115:2003 metadata encoded in ISO19139 to be the most appropriate Requirement at this time. Guidance is provided in chapter 8 on how to populate the catalogue if your metadata is encoded in ISO19115-3:2014

Requirements for accessing data are diverse, necessitating some consideration be given to standardizing profiles to reduce potential interoperability issues.

Metadata in catalogues represent resource characteristics that can be queried and presented for evaluation and processing by both humans and software. Catalogue services are required to support the discovery and binding to registered information resources within an information community. This DGIWG profile is a use-case dependent implementation profile of the Catalogue Service Implementation standard.

i. Submitting organizations

For the Defence Geospatial Information Working Group (DGIWG):

Nation	Parent organization
United Kingdom	Joint Forces Intelligence Group (JFIG)
Germany	Bundeswehr Geoinformation Centre (BGIC)
France	Institut Géographique National (IGN)
United States	National Geospatial-Intelligence Agency (NGA)

ii. Document point of contact

All questions regarding this document are to be directed to secretariat@dgiwg.org

iii. Revision history

Date	Release	Primary clauses (item) modified	Description
2017-02	1.0.1	Abbreviation GMD	Added GMD - Geographic Metadata extensible Markup language
2017-02	1.0.1	Normative Requirements table	Table 3 IDs 4 to 14 rewritten for clarity.
2017-02	1.0.1	GetCapabilities	Requirements 6 to 8 added to enhance clarity.
2017-02	1.0.1	GetRecords	Requirements 4 to 7 updated to enhance clarity.
2017-02	1.0.1	GetRecordByID	Requirement 8 removed
2017-02	1.0.1	GetRecordByID	Requirements 9 & 10 updated to enhance clarity.
2017-02	1.0.1	Information Models	Note added to enhance clarity.
2017-02	1.0.1	Annex A – Abstract Test Suite A.1.2	References to tables 10 (Requirement 15) and 11 (Requirement 16) removed to enhance clarity.

iv. Future work

Future work will include the consideration of a profile of OGC Catalogue Services Specification 3.0. It will also consider the merit of a profile of the CSW-ebRIM implementation of CSW.

The current profile supports ISO 19115:2003 metadata encoded in ISO 19139 format. Similarly, it supports ISO 19119:2006 service metadata standard. Future work will address the Requirement to support ISO 19115:2014 (which replaces ISO 19115:2003 and ISO019119:2006) and its associated encoding ISO 19115-3:2014 (which replaces ISO 19139).

Considerable experimentation is being undertaken within the Open Geospatial Consortium (OGC) around the use of the W3C Data Catalog Vocabulary (DCAT). The use of DCAT, once standardized in the OGC, may be relevant to this profile.

1. Introduction

Catalogue services support the ability to publish and search collections of descriptive information (metadata) for data, services, and related information objects. Metadata in a catalogue service define resource characteristics that can be queried and presented for evaluation and processing by both humans and software.

The Open Geospatial Consortium (OGC) defines an overall Catalogue Service for the Web specification (CSW), Ref [2] with two specific application profiles. The first of these profiles is the CSW 2.0.2 ISO Metadata Application Profile (CSW-ISO), REF [3] which uses the ISO 19115/19119 model for the cataloguing of resources (e.g. datasets and services). However, it does not support the cataloguing of other related information objects (its focus is primarily geospatial). The second profile is the ebRIM Profile of CSW REF [9] which provides a general and flexible model to support the location, access and exploitation of a wide range of resources including datasets, services and related information objects (such as portrayal rules). At the time of this profile's development CSW version 3.0 lacked the updated application profiles (CSW ISO and CSW ebRIM) required to implement it and had a very limited number of implementations.

This standard defines a military implementation profile for the OpenGIS Catalogue Services specification 2.0.2 with the ISO 19115/19119 Metadata Application Profile to enable interoperable discovery of resources (e.g. geospatial datasets and services) within a multi-national coalition.

The objective of the DGIWG Catalogue project team was to create military implementation profile for OGC catalogue services. The intention of the profiles is to maximize interoperability specifically in a military context by mandating a minimum set of service Requirements and metadata necessary to improve usability in an operational coalition environment.

2. Scope

This DGIWG standard defines a military implementation profile for the OpenGIS Catalogue Services specification 2.0.2 with the ISO 19115/19119 Metadata Application Profile to enable interoperable discovery of resources (e.g. geospatial datasets and services) within a multi-national coalition. The intention is to minimize interoperability issues specific to a military context and to mandate a minimum set of service Requirements necessary to ensure usability in an operational coalition environment.

3. Conformance

Conformance with this specification shall be checked using all the relevant tests specified by the Abstract Test Suite (ATS) in Annex A (normative).

Table 1: Conformance Classes

DGIWG CSW Profile Conformance Classes	Operations	Supported Operators	Bindings	Additional
DGIWG_Basic_CSW (extends REF [3] CSW) ***(Identifier:*** http://www.dgiwg.org/std/csw/1.0/conf/DGIWG_Basic_CSW***)***	GetCapabilities DescribeRecord GetRecords GetDomain GetRecordById	Filter Encoding CQL_Test	HTTP Get HTTP Post	CRSs Supported
DGIWG_CSWT (Transactional) (Extends Ref [3] CSW-T) ***(Identifier:*** http://www.dgiwg.org/std/csw/1.0/conf/DGIWG_Basic_CSW_t***)***	Includes all of DGIWG_Basic_CSW capability class.			
	Harvest Transaction		HTTP Post	

A 'read-only' catalogue service provides all operations of the DGIWG_CSW base capability class. In addition, a transactional catalogue service provides the operations harvest and transaction.

The Manager functions of the CSW-T capability class provide a standardized interface for the transactional (push-model) or the harvesting (pull-model) of metadata. The CSW-T is an additional capability of the DGIWG CSW.

4. References

4.1. Normative References

This document refers to the following normative references:

1. DGIWG. DGIWG Metadata Foundation (DMF) 2.0, 12 July 2017. *(https://portal.dgiwg.org/files/?artifact_id=67565)*
2. OpenGIS. Catalogue Service Implementation Specification 2.0.2, 2007. (07-006r1) http://portal.opengeospatial.org/files/?artifact_id=20555 .
3. OpenGIS. Catalogue Services Specification 2.0.2 - ISO Metadata Application Profile. 2007. (07-045) http://portal.opengeospatial.org/files/?artifact_id=21460 .
4. HTTP Protocol Specification, IETF (rfc 2616)

   https://www.w3.org/Protocols/rfc2616/rfc2616.txt
5. HTTPS Protocol Specification, IETF (rfc 2818) https://tools.ietf.org/html/rfc2818.txt
6. ISO 191115:2003, Geographic Information – Metadata
7. ISO 19115/Cor.1:*2006, Geographic information – Metadata, Technical Corrigendum (Revision of ISO 19115:2003)*
8. ISO 19139:2007, Geographic Information – Metadata – XML schema implementation
9. ISO 19119*:2005, Geographic information - Services*

10. ISO 19119:*2005* Amd 1:2008, *Geographic information – Services*
11. OpenGIS Filter Encoding Specification 1.1 (04-095) http://portal.opengeospatial.org/files/?artifact_id=8340

4.2. Informative References

This document refers to the following informative references:

1. OGC® Catalogue Services 3.0 - General Model (12-168r6), http://docs.opengeospatial.org/is/12-168r6/12-168r6.html
2. OGC® Catalogue Services 3.0 Specification - HTTP Protocol Binding (12-176r7) http://docs.opengeospatial.org/is/12-176r7/12-176r7.html
3. CSW-ebRIM Registry Service - Part 1: ebRIM profile of CSW (1.0.1), (07-110r4)

   http://portal.opengeospatial.org/files/?artifact_id=31137
4. CSW-ebRIM Registry Service - Part 2: Basic extension package (1.0.1) (07-144r4) http://portal.opengeospatial.org/files/?artifact_id=31138
5. OGC I15 (ISO 19115 Metadata) Extension Package of CSW ebRIM Profile 1.0, (13-084r2), https://portal.opengeospatial.org/files/?artifact_id=56905
6. ISO 19115-1:2014, Geographic information – Metadata – Part 1:Fundamentals
7. ISO 19115-2:2009, Geographic information — Metadata – Part2: Extensions for imagery and gridded data
8. ISO 19115-3:2016 Geographic information -- Metadata -- Part 3: XML schema implementation for fundamental concepts
9. Transforms between ISO 19139 and ISO 19115-3:2014 http://standards.iso.org/iso/19115/resources/transforms/ISO19139

5. Terms, definitions, and abbreviations

5.1. Definitions

For the purposes of this document, the following terms and definitions in OGC 07-006r1 and OGC 07-045 apply.

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5.2. Abbreviations

The following abbreviations are used in this document.

Table 2: Abbreviations

CORBA	Common Object Request Broker Architecture
CQL	Common Query Language
CRS	Coordinate Reference System
CSW ISO	ISO 19115/19119 Application Profile of Catalogue Service for the Web
CSW	Catalogue Service for the Web
CSW-T	Catalogue Service for the Web - Transactional
CQL_Text	Common Query Language – Text Format
DGIM	DGIWG Geospatial Information Model
DGIWG	Defence Geospatial Information Working Group
DMF	DGIWG Metadata Foundation
ebRIM	Electronic Business Registry Information Model
FTP	File Transfer Protocol
GMD	Geographic Metadata extensible Markup language
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
I15	ISO19115 Metadata Extension Package of CSW ebRIM Profile 1.0
ISO	International Organization for Standardization
IETF	Internet Engineering Task Force
KVP	Keyword Value Pair
OGC	Open Geospatial Consortium
RFC	Request for Comments
SOAP	Simple Object Access Protocol
UML	Unified Modelling Language
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
URN	Uniform Resource Name
W3C	World Wide Web Consortium
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service
WMTS	Web Map Tile Service
WSTP	Web Services Technical Panel
XML	Extensible Markup Language
Z39.50	Service definition for information search and retrieval, also known as ISO 23950

6. System Context (Informative)

This section is informative and gives an overview of the different CSW conformance classes that can be used to build profiles of the standard.

6.1. Application Domain

Catalogue services are the key technology for locating, managing and maintaining distributed geo-resources (i.e. geospatial data and services).

In a coalition environment, the accessibility and usability of catalogue information is vital for a successful federated provision of geospatial, oceanographic and meteorological information designated for the planning and conduct of joint operations in a specific area at a specific time and which supports the unity of effort throughout the battlespace. The OGC catalogue standards break down into a number of components supporting different information models.

Note the standard on which this profile is based supports ISO 19115.

6.2. Essential Use Cases

These use cases describe the various steps in exploiting the catalogue service. Some use cases are pre-requisites to others. This is noted in the use cases themselves.

6.2.1. Dataset Discovery Use Case

Users (via client applications or portals) wish to discover foundation datasets (maps and charts, imagery, terrain, etc.) and the services that deliver them. Datasets are typically static maps, charts or other ‘classic’ vector and raster data products. Users specify a series of dataset query parameters defined as ‘core queryables’ such as Resource Identifier, Resource Extent, Resource Edition Date and Resource Edition. Searches may also be required on themes such as Oceans or Transportation (for example using the Metadata TopicCategory codelist). Users can then search for services of defined types that provide discovered datasets, for example querying on ServiceType or ServiceTypeVersion.

A typical search would use the CSW GetRecords call with a query to “Find all Datasets (by returning summary dataset metadata) within a given Geographic Area and with a scale of 50,000”. The result would be requested in summary metadata form (called a metadata record) for display in a list.

6.2.2. Evaluation Use Case

A precursor to this use case is 6.2.1, or 6.2.4 (Dataset Discovery, Federated Search respectively).

Users have discovered resources and wish to review detailed information about those resources to confirm they are fit for purpose (i.e. the database can be used for the purpose it was intended for, for example satellite imagery has sufficiently low cloud cover to be usable.for digitization, this can only be assessed by examining the detailed metadata). Users select one or more items discovered for evaluation (catalogue entries). They evaluate the selected catalogue entry by requesting and reviewing the full metadata associated with a catalogue entry. Metadata is typically formatted by the client into a human readable form. In some cases, they may also wish to review either a thumbnail or if possible a full visualization of the dataset to allow them to decide if it is fit for purpose. If providing a ‘full’ preview of the dataset, then this use case will exploit both the catalogue and associated web services. The catalogue

service is used to identify services available for a selected dataset and these are accessed to provide the ‘preview’.

A typical search would use the CSW GetRecordById call with a query the full metadata for one of the items returned from the previous call. The request would return full ISO Metadata for the item Id (present in the results from item 6.2.1).

6.2.3. Exploitation Use Case

A precursor to this use case is 6.2.2 (Evaluation).

This use case relates to obtaining the necessary information to provide to an application (web, desktop or mobile) enabling it to use the data selected. The catalogue’s role is to provide information on the service types/resource links available to deliver the resource (for example WFS, WCS, download link) so that the user can use these to access the data, either transactionally or via download.

Having found the dataset of interest, in order to exploit it, it is necessary to find a service. To do this a typical search would be “Find all services which operate on Dataset (the dataset of interest from phase 6.2.1)

6.2.4. Distributed/Federated Search Use Case

Users search the federated catalogue and obtain results from multiple catalogues. Often military users need to discover a range of resources. This may require the user to search multiple catalogue services which can be time consuming and inefficient. Catalogue services need to provide the user with a consolidated set of results from across multiple catalogues in the enterprise. From a user perspective, this means there is a search from a single point of presence.

6.2.5. Updating Catalogue Content

A precursor to this use case may be 6.2.1, or 6.2.4 (Dataset Discovery, and Federated Search respectively) and 6.2.2 (Evaluation) where updates are being made to existing content.

Users or systems may produce geospatial information and publish it via web services, but not directly provide a catalogue. In order to catalogue this information, a user or system needs to upload metadata describing the geospatial information and service endpoint. This means users need to create a new entry (by uploading metadata), replace an entry or delete the entry. This functionality could either be provided via a CSW-T (Transactional) or by directly entering the information on the server which provides the CSW service.

7. DGIWG Basic CSW (Normative)

This section is normative and defines the DGIWG_Basic_CSW conformance class.

(Identifier: http://www.dgiwg.org/std/csw/1.0/conf/dgiwg_basic_csw ***)***

7.1. Normative Requirements

The Normative Requirements requested by this conformance class are summarized in Table 3: DGIWG Basic CSW Requirements

Table 3: DGIWG Basic CSW Requirements

No.	Requirement	Compliance
1	A DGIWG Basic CSW server shall implement the OGC CSW-ISO (REF [2]) CSW conformance class	M
2	A DGIWG CSW Server shall support English in all queryables and returnables.	M
3	Services that implement this profile SHALL support HTTP as defined in REF [2].	M
4	Services that implement this profile SHALL include the following information in the abstract element of the service metadata: "This service implements the DGIWG Catalogue Service for the Web ISO Profile version 1.0, DGIWG Basic CSW conformance class (http://www.dgiwg.org/std/csw/1.0/conf/basic).	M
5	Services that implement this profile SHALL advertise the additional queryables from 7.7.3 in the GetCapabilities document.	M
6	Services that implement this profile SHALL for the GetRecords Operation support both csw:Record and gmd:MD_Metadata return types for this operation in addition to mandatory Requirements defined in REF [3]	M
7	Services that implement this profile SHALL support all queryable elements of GetRecords defined in tables 5,6,8,9 and 10 in sections 7.7.1 and 7.7.3. (	M
8	Services that implement this profile SHALL support all returnable elements for GetRecords request defined in tables 5,6,8,9 and 10 in sections 7.7.1 and 7.7.3.	M
9	Services that implement this profile SHALL for the GetRecords Operation support GMD_Metadata compliant with REF [1] (DGIWG Metadata Foundation).	M
10	Services that implement this profile SHALL support all returnable elements for GetRecordById request defined in tables 5,6,8,9 and 10 in sections 7.7.1 and 7.7.3.	M
11	Services that implement this profile SHALL for the GetRecords Operation support GMD_Metadata compliant with REF [1] (DGIWG Metadata Foundation).	M
12	Metadata catalogued in a DGIWG-CSW service shall be compliant to the DGIWG Metadata Foundation (DMF) 2.0 DMF/Core and specifically its mapping to ISO 19139.	M
13	The mapping in tables in sections 7.7.1 and 7.7.3 SHALL be used to map the CSW defined queryables/returnables to the relevant DMF elements.	M
14	The mapping in table 5 SHALL be used to map the CSW defined queryables/returnables to the relevant DMF elements	M

No.	Requirement	Compliance
15	Implementations of this DGIWG profile shall implement support for the General Metadata Items shown in table 5 as applying to both Dataset and Service Objects.	M
16	Implementations of this DGIWG profile shall implement support for querying using the additional Metadata Items shown in table 6 for Dataset and DatasetCollection elements.	M
17	Implementations of this DGIWG profile shall implement support for querying using the additional Metadata Items shown in table 7 for Service elements.	M

7.2. Non-Normative Recommendations for Implementation

The non-normative Requirements requested by this profile are summarized in Table 4.

Table 4: **DGIWG Basic CSW Recommendations**

No.	Recommendation	Compliance
1	This profile does not require support for the CORBA Protocol Binding described in REF [2].	O
2	This profile does not require support for the Z39.50 Protocol Binding described in REF [2].	O
3	If metadata to populate the catalogue is only available in ISO19115-3:2016 the recommended is to transform it to ISO19139 using the XSLT developed by ISO within the ISO19115-3 TC211 project	O
4	This profile recommends that client implementations of CSW ISO do not depend on the availability of HTTP POST for the GetRecords operation as this is optional in REF [2] despite many server implementations supporting them.	O
5	This profile recommends that client implementations of CSW ISO do not depend on the availability of HTTP GET as this is optional in REF [2] despite many server implementations supporting them.	O
6	This profile recommends that client implementations of CSW ISO do not depend on the availability of HTTP POST for the GetRecordById operation in the as this is optional in REF [2] despite many server implementations supporting them.	O
7	This profile recommends that client implementations of CSW ISO do not depend on the availability of HTTP GET for the Harvest operation as this is optional in REF [2] despite many server implementations supporting them.	O

7.3. Introduction

The DGIWG Basic CSW Profile is based on the OGC CSW-ISO (Ref [2]) Requirements class.

Requirement 1: A DGIWG Basic CSW server shall implement the OGC CSW-ISO REF [3] CSW conformance class.

The relevant operations and parameters for the DGIWG Basic CSW profile are discussed in the following sections.

7.4. Native language support

Requirement 2: A DGIWG CSW Server shall support English in all queryables and returnables.

Support for other languages is optional.

7.5. Web Service Interface Protocols

CSW 2.0.2 supports a number of protocol bindings.

7.5.1. CORBA Protocol Binding (Obsolete)

Recommendation 1: This profile does not require support for the CORBA Protocol Binding described in REF [2].

7.5.2. Z39.50 Protocol Binding (Obsolete)

Recommendation 2: This profile does not require support for the Z39.50 Protocol Binding described in REF [2].

7.5.3. HTTP Protocol Binding

The HTTP/HTTPS Protocol interface for CSW 2.0.2 is based on XML/RPC. The following sections outline the specific XML/RPC Methods from CSW 2.0.2 and identifies any specific qualifications of these.

Requirement 3: Services that implement this profile SHALL support HTTP as defined in REF [2].

Note: Ref [2] states: “This document does not demand any specific security considerations regarding a compliant catalogue service. Security issues are part of the implementation specification of a catalogue service. But it is recommended that HTTP Basic Authentication is used to prevent access to the URLs of the transaction interface, unless the requestor can provide user/password credentials. This basic authentication should be used in conjunction with HTTPS as part of a security solution.”

7.6. Service Interface

The following service interfaces are qualified by this profile.

7.6.1. GetCapabilities

Requirement 4: Services that implement this profile SHALL include the following information in the abstract element of the service metadata: "This service implements the DGIWG Catalogue Service for the Web ISO Profile version 1.0, DGIWG Basic CSW conformance class (http://www.dgiwg.org/std/csw/1.0/conf/basic***)”.***

Requirement 5: Services that implement this profile SHALL advertise the additional queryables from 7.7.3 in the GetCapabilities document.

7.6.2. GetRecords

Requirement 6: Services that implement this profile SHALL, for the GetRecords Operation support both csw:Record and gmd:MD_Metadata return types for this operation in addition to mandatory Requirements defined in REF [3]

Requirement 7: Services that implement this profile SHALL support all queryable elements of GetRecords defined in tables 5, 6, 8, 9 and 10 in sections 7.7.1 and 7.7.3.

Requirement 8: Services that implement this profile SHALL support all returnable elements for GetRecords request defined in tables 5, 6, 8, 9 and 10 in sections 7.7.1 and 7.7.3

Requirement 9: Services that implement this profile SHALL for the GetRecords operation support gmd:MD_Metadata compliant with REF [1] (DGIWG Metadata Foundation).

7.6.3. GetRecordById

Note: REF [3] only mandates that clients implement one of these methods. This represents a real interoperability issue unless both are implemented.

Requirement 10: Services that implement this profile SHALL support all returnable elements for GetRecordById request defined in tables 5, 6, 8, 9 and 10 in sections 7.7.1 and 7.7.3.

Requirement 11: Services that implement this profile SHALL for the GetRecordById operation support gmd:MD_Metadata compliant with REF [1] (DGIWG Metadata Foundation).

7.6.4. GetDomain

There are no additional Requirements in this profile over and above those defined in the CSW Requirements class in REF [3].

7.7. Information Models

The information in this section describes the CSW core queryables and returnables for the supported operations described in section 8.6.

Requirement 12: Metadata catalogued in a DGIWG-CSW service shall be compliant to the DGIWG Metadata Foundation (DMF) 2.0 DMF/Core and specifically its mapping to ISO 19139 and shall not support DMF/Sensor and DMF/Data+.

Note: DMF/Sensor and DMF/Data+ are only defined for ISO19115-3:2015 (as they are part of ISO19115-2:2009 imagery metadata) and so cannot be encoded in ISO19139 and therefore cannot be stored in a CSW-ISO which only supports ISO19139.

Note: DMF requires support for one of the following metadata encoding standards:

- ISO 19139
- ISO 19115-3:2016.

These Requirement dependencies are defined within the DMF [REF 1]. This profile specifically focusses on the DMF implementation of ISO 19139 as the CSW-ISO application profile on

which this profile is based (REF [3]) does not support ISO 19115-3:2016. Future standardization efforts on REF [3] to include ISO 19115-3:2016 in this profile are listed under future work.

Recommendation 3: If metadata to populate the catalogue is only available in ISO19115-3:2016 the recommended is to transform it to ISO19139 using the XSLT developed by ISO within the ISO19115-3 TC211 project.

The XSLT transforms from ISO19115-3 to ISO19139 and from ISO19139 to ISO19115-3 are available at:

http://standards.iso.org/iso/19115/resources/transforms/ISO19139

7.7.1. OGC Core returnable and queryable metadata elements

Requirement 13: The mapping in table 5 SHALL be used to map the CSW defined queryables/returnables to the relevant DMF elements.

The following mappings have been done in accordance with ISO 19115/ISO 19119 Application profile of CSW (OGC 07-006r1). The I15 extension of CSW ebRIM application profile has compatible metadata Requirements. The purpose is to express the visibility of DMF through OGC Catalogue services. A returnable element is an element that is returned by the service and a queryable element is an element that can be queried (i.e. filters can apply to this element).

Table 5: OGC-CSW /DMF Metadata Mappings

Term used in OGC returnable	***Term used in OGC queryables***	***Definition***	***Corresponding DMF element***
	AnyText	A target for full-text search of character data types in a catalogue	Whole resource text.
Subject		A topic of the content of the resource. This is a place where a Topic Category or other taxonomy could be applied.	DGITYP RSGFLV RSPREF RSDTLVL RSTHEME RSKWDS.keyword RSTOPIC
Title	Title	A name given to the resource. Also known as “Name”.	RSTITLE
Description	Abstract	An account of the content of the resource. This is also known as the “Abstract” in other aspects of OGC, FGDC, and ISO metadata.	RSABSTR
Format	Format	The physical or digital manifestation of the resource	RSDFMT.citation.title
Identifier	Identifier	A unique reference to the record within the catalogue	MDSID

Term used in OGC returnable	***Term used in OGC queryables***	***Definition***	***Corresponding DMF element***
Date	Modified	The date of a creation or update event of the catalogue record.	MDDATE
Type	Type	The nature or genre of the content of resource.	RSTYPE
Coverage	BoundingBox	The spatial extent or scope of the content of the resource.	RSEXT.boundingBox
Source	Source	A reference to a resource from which the present resource is derived.	Not supported (because not supported by ISO CSW AP and the source metadata elements are not really suitable for queries.)
Relation	Association	The name of the relationship that exists between the resource described by this record and a related resource referenced using the *Source* or *dc:source* property.	Not supported
	CRS	Geographic Coordinate Reference System (Authority and ID) for the BoundingBox	RSRSYS.code
Creator		An entity primarily responsible for making the content of the resource.	RSRPTY::originator.organisationName
Publisher		An entity responsible for making the resource available. This would equate to the distributor in ISO and FGDC metadata.	RSRPTY::publisher.organisationName
Contributor		An entity responsible for making contributions to the content of the resource.	RSRPTY:author.organisationName
Language		A language of the intellectual content of the catalogue record.	MDDLOC.language[1]
Rights		Information about rights held in and over the resource.	RSLCST.access
Rights		Right can be expressed in RSLCST.use as well as RSTCST (same domain of values)	RSLCST.use

[1]: When a catalogue supports the Cultural and Linguistic adaptability, then it will also provide MDDLOC.language as a returnable language.

Requirement 14: The additional queryable and returnable metadata elements in table 6 shall be supported.

Table 6: Additional Queryables/Returnables

Term used in OGC returnable	Term used in OGC queryables	Definition	Corresponding DMF element
ClassificationLevel		ClassificationLevel	RSSCST.level
Releasability			RSREL.statement
AdditionalLegalConstraints			RSLCST.statement RSLCST.other
AdditionalSecurityConstaints			RSSCST.limitation RSSCST.note RSSCST.handling

7.7.2. DMF/Core involved in CSW

The following table presents the DMF/Core elements that are visible in a CSW. Elements with a white background are queryable/returnable elements and elements with grey background are only returnable. This gives an idea of the visibility of these elements in CSW catalogues.

Table 7: Additional Queryables/Returnables

DMF Identifier	Title	Card
MDSID	Metadata Set Identifier	0..1
MDDLOC	Metadata Default Locale	1
MDRPTY	Metadata Responsible Party	1..*
MDDATE	Metadata Date Stamp	1
MDSTD	Metadata Standard	1
RSTITLE	Resource Title	1
RSABSTR	Resource Abstract	1
RSPURP	Resource Purpose	0..1
RSTYPE	Resource Type Code	1
RSTYPN	Resource Type Name	0..1
RSED	Resource Edition	0..1
RSEDDAT	Resource Edition Date	0..1
RSID	Resource Identifier	0..*
RSKWDS	Resource Keyword Set	0..*
THUMB	Resource Thumbnail	0..1
RSSCALE	Resource Equivalent Scale	0..*
RSGSD	Resource Ground Sample Distance	0..1
RSLOC	Resource Locale	1..*
RSRPTP	Resource Spatial Representation Type	0..1

DMF Identifier	Title	Card
DGITYP	Geospatial Information Type	0..1
RSGFLV	Resource Georeferencing Level	0..1
RSPREF	Resource Representation Form	0..1
RSTOPIC	Resource Topic Category	1..*
RSTHEME	Resource Theme	0..*
RSSERI	Name of Resource Series	0..1
RSSHNA	Resource Sheet Name	0..1
RSEXT	Resource Extent	0..*
RSRSYS	Resource Reference System	0..*
RSDATE	Resource Reference Date	1..*
RSRPTY	Resource Responsible Party	0..*
RSSCST	Resource Security Constraint	0..1
RSUSE	Resource Use Limitation	0..*
RSLCST	Resource Legal Constraint	0..*
RSLING	Resource Lineage	1
RSDFMT	Resource Distribution Format	1..*
RSONLLC	Resource Online Location	0..*

7.7.3. ISO AP additional returnable and queryable metadata elements

Requirement 15: Implementations of this DGIWG profile shall implement support for the General Metadata Items shown in table 8 as applying to both Dataset and Service Objects.

Table 8: General Metadata Elements

ISO element name	Term used in OGC queryables	Definition	Corresponding DMF element
RevisionDate	RevisionDate	Revision date of the resource	RSDATE::revision
	AlternateTitle	Alternate title of the resource	RSALT [DMF/Common]
	CreationDate	Creation Date of the resource	RSDATE::creation
	Publication Date	Publication Date of the resource	RSDATE::publication
	Organisation Name	Name of the organisation providing the resource	RSRPTY.organisation Name[1]
	HasSecurity Constraints	Are there any security constraints?	True if SECCST is set
Resource Identifier	Resource Identifier	Identifier of the resource	RSID.code RSSHNA
Parent Identifier	ParentIdentifier	FileIdentifier of the metadata to which this metadata is a subset (child)	MDPTSID
	KeywordType	Methods used to group similar keywords	RSKWDS.type
Hierarchy LevelName		MD_Metadata.hierarchyLevelName	RSTYPN
MetadataStandard Name		MD_Metadata.metadataStandardName	MDSTD.title
MetadataStandard Version		MD_Metadata.metadataStandardVersion	MDSTD.version
MetadataCharacter Set		MD_Metadata.characterSet.MD_ScopeCode@codeListValue	MDDLOC.encoding
GraphicOverview		MD_Metadata.identificationInfo.AbstractMD_Identification.graphicOverview.MD_Browse Graphic.fileName	GPHICS.name ***[DMF/Common]*** THUMB

ISO element name	Term used in OGC queryables	Definition	Corresponding DMF element
ReferenceSystem • code, codeSpace • version		MD_Metadata.referenceSystemInfo.MD_ReferenceSystem.referenceSystemIdentifier.RS_Identifier.code, MD_Metadata.referenceSystemInfo.MD_ReferenceSystem.referenceSystemIdentifier.RS_Identifier.codeSpace MD_Metadata.referenceSystemInfo.MD_ReferenceSystem.referenceSystemIdentifier.RS_Identifier.version	• RSRSYS.uri
Lineage		MD_Metadata.dataQualityInfo.DQ_DataQuality.lineage.LI_Lineage.statement	RSLING
OnlineResource		MD_Metadata.distributionInfo.MD_Distribution.transferOptions.MD_DigitalTransferOption.onLine.CI_OnlineResource.linkage.URL	RSONLLC.linkage
FormatVersion		MD_Metadata.distributionInfo.MD_Distribution.distributionFormat.MD_Format.version	RSFMT.citation.version

[1]: The namespace is not returned.

Requirement 16: Implementations of this DGIWG profile shall implement support for querying using the additional Metadata Items shown in tables 9 for Dataset and DatasetCollectionelements.

Table 9: Dataset Metadata Elements

Element name	Term used in OGC queryables	Definition	Corresponding DMF element
TopicCategory	TopicCategory	Main theme(s) of the dataset.	RSTOPIC[1]
ResourceLanguage	ResourceLanguage	Language(s) used within the dataset	RSLOC.language
	GeographicDescriptionCode	Description of the geographic area using identifiers.	RSEXT.geogId.code[2]
SpatialResolution	*SpatialResolution* • Denominator • DistanceValue + DistanceUOM	Factor which provides a general understanding of the density of spatial data in the dataset.	• RSSCALE • RSGSD
	TemporalExtent	Temporal extent of the resource	RSEXT.temporalExtent
CharacterSet		MD_Metadata.identificationInfo.MD_DataIdentification.characterSet.MD_CharacterSetCode@codeListValue	RSDLOC (Default).encoding / RSTLOC (Other).encoding[3]
SpatialRepresentationType		MD_Metadata.identificationInfo.MD_DataIdentification.spatialRepresentationType.MD_SpatialRepresentationTypeCode@codeListValue	RSRPTP

[1]: The namespace is not returned.

[2]: CSW ISO AP provides the MD_DataIdentification with the service metadata (the RSID.code of the operated dataset).

[3]: With reference to other if you have a different encoding than the default e.g. UTF8 for example UTF16 then RSTLOC.encoding would be used.

Requirement 17 Implementations of this DGIWG profile shall implement support for querying using the additional Metadata Items shown in table 10 for Service elements.

Table 10: **Service Metadata *Elements***

Element name	Term used in OGC queryables	Definition	Corresponding DMF element
ServiceType	ServiceType	Name of a service type.	SRTYPE
ServiceTypeVersion	ServiceTypeVersion	The version of a service type.	SRTVER
	GeographicDescription Code	Description of the geographic area using identifiers.	RSEXT.geogId.code[1]
	OperatesOnData OperatesOn OperatesOnIdentifier OperatesOnName	Specifies the tightly coupled dataset relation	• SROPRS[2] • SRCORS.identifier • SRCORS.operationName
CouplingType	CouplingType	The coupling type of this service.	SRCPLING
ServiceOperation Operation DCP Linkage	Operation	Name of a service operation.	SROPER.name SROPER.platform SROPER.connectPoint.linkage

[1]: The namespace is not returned.

[2]: CSW ISO AP provides the MD_DataIdentification with the service metadata (the RSID.code of the operated dataset).

7.8. Client Recommendations

7.8.1. GetRecords

Recommendation 4: This profile recommends that client implementations of CSW ISO do not depend on the availability of HTTP GET for the GetRecords operation as this is optional in REF [3] despite many server implementations supporting them.

Recommendation 5: This profile recommends that client implementations of CSW ISO do not depend on the availability of the CQL_Text query language as this is optional in REF [3] despite many server implementations supporting them (Only the OGC Filter Encoding Specification (REF [3]), query language is mandatory in the base specification).

7.8.2. GetRecordById

Recommendation 5: This profile recommends that client implementations of CSW ISO do not depend on the availability of HTTP POST for the GetRecordById operation as this is optional in REF [3] despite many server implementations supporting them.

7.8.3. GetDomain

Recommendation 6: This profile recommends that client implementations of CSW ISO do not depend on the availability of HTTP GET for the GetDomain operation as this is optional in REF [3] despite many server implementations supporting them.

8. DGIWG Transactional CSW (Normative)

This section is normative and defines the DGIWG_CSW_T conformance class.

(Identifier: http://www.dgiwg.org/std/csw/1.0/conf/dgiwg_cswt ***)***

8.1. Normative Requirements

The Normative Requirements requested by this conformance class are summarized in table 11.

Table 11: **DGIWG CSWT Requirements**

No.	Requirement	Compliance
18	In order to comply with the requirements in this class Implementors must also comply with the DGIWG CSW Basic and CSW-ISO (Ref[3]) CSWT conformance classes.	M
19	Services that implement this conformance class of the profile SHALL include the following information in the abstract element of the service metadata: "This service implements the DGIWG Catalogue Service for the Web ISO Profile version 1.0, DGIWG Basic CSW conformance class (http://www.dgiwg.org/std/csw/1.0/conf/basic) and DGIWG Transactional CSW (http://www.dgiwg.org/std/csw/1.0/conf/dgiwg_cswt)". This text replaces the text specified in Requirement 4.	M
20	Services that implement this profile SHALL support the Harvest of metadata which is compliant with the DMF (REF [1]).	M

8.2. Non-Normative Recommendations for Implementation

The non-normative Requirements requested by this profile are summarized in 12.

Table 12: **DGIWG CSWT Recommendations**

No.	Recommendation	Compliance
8	None	O

8.3. Introduction

The DGIWG CSW Transactional Conformance class is based on the DGIWG_Basic_CSW conformance class OGC CSW-ISO (Ref [2]) Requirements class CSWT. It only adds one requirement over and above CSWT, but does require that the requirements of DGIWG_Basic_CSW are also met.

Requirement 18: In order to comply with the requirements in this class Implementors must also comply with the DGIWG CSW Basic and CSW-ISO (Ref[3]) CSWT conformance classes.

Requirement 19: Services that implement this conformance class of the profile SHALL include the following information in the abstract element of the service metadata: "This

service implements the DGIWG Catalogue Service for the Web ISO Profile version 1.0, DGIWG Basic CSW conformance class (http://www.dgiwg.org/std/csw/1.0/conf/basic) and DGIWG Transactional CSW ("http://www.dgiwg.org/std/csw/1.0/conf/dgiwg_cswt)." This text replaces the text specified in Requirement 4.

8.4. Service Interface

The DGIWG CSW Transactional conformance class implements the following operations from the CSW-ISO (Ref [3] CSWT Conformance class, with the changes noted.

8.4.1. Insert Operation

This profile does not define any additional requirements or recommendations in relation to this operation.

8.4.2. Update Operation

This profile does not define any additional requirements or recommendations in relation to this operation.

8.4.3. Delete Operation

This profile does not define any additional requirements or recommendations in relation to this operation.

8.4.4. Harvest Operation

Requirement 20: Services that implement this profile SHALL support the Harvest of metadata which is compliant with the DMF (REF [1]).

There are no additional Requirements in this profile over and above those defined in the CSW Requirements class in REF [3]. The DGIWG-CSWT class does of course import the Requirements of DGIWG-CSW as well as CSWT and so is in that respect an enhancement of CSWT.

Annex A – Abstract Test Suite

(normative)

As there is no abstract test suite defined for the CSW-ISO 19115/19119 Application Profile (CS-W ISO) on which this profile is based, this profile recommends base tests for CS-W ISO as well as describing tests for the additional Requirements implied by this document. The following provides abstract tests for a DGIWG CSW Profile.

A.1 Conformance classes

A.1.1 GetCapabilities for DGIWG Basic CSW

a) Test Purpose: Verify that the server implements DGIWG the following DGIWG requirements (Requirement 1, Requirement 2, Requirement 3, Requirement 4, Requirement 5, Requirement 6, Requirement 7, Requirement 8, Requirement 9, Requirement 10, and Requirement 11).

b) Test Method:

- Issue an HTTP GET capabilities request.
- Verify that the service responds without error to the request with a Capabilities document (Requirement 1 and Requirement 3).
- Verify that the response indicates support for ‘English’ for queriables and returnables. (Requirement 2).
- Verify that the response metadata link includes the profile text described in requirement 4.
- Verify that the XML response indicates support for csw:Record and gmd:MD_Metadata return types for the GetRecords operation. (Requirement 6).
- Verify that the reported queriables and returnables for the GetRecords operation. At least include those defined in sections 7.1.1 and 7.1.3. (Requirements 5, 8).
- Verify that the XML response indicates support for csw:Record and gmd:MD_Metadata return types for the GetRecordById operation. (Requirement 11).
- Verify that the reported queriables and returnables for the GetRecordById operation. At least include those defined in sections 7.1.1 and 7.1.3. (Requirement 10).

c) References: Sections 7.3, 7.4, 7.5, 7.6.1.

d) Test Type: Capability

A.1.2 GetRecord for DGIWG Basic CSW

a) Test Purpose: Verify that the server implements DGIWG the following DGIWG requirements (Requirement 6, Requirement 7, Requirement 8, Requirement 9).

b) Test Method:

- Ensure that the CSW is loaded with metadata which supports all of the queriables and returnables described in table 5, 6, 8, 9 and 10.

- Issue a number of HTTP POST GetRecords requests with return types of both csw:Record and gmd:MD_Metadata using all of the queriables in Tables 5 and 6. Verify that a valid result is obtained (Requirements 6, 7).
- Verify that all metadata returnables are present in the result (Requirement 8).
- Verify that the gmd:MD_Metadata record returned is compliant with the DMF specification (Requirement 11) and with ISO19139 (Requirement 12). Returnables shall be mapped to the DMF using tables 5,6,8,9 and 10 (Requirement 8) and additional items in table 9 (Requirement 14).

c) References: Sections 7.3, 7.4, 7.5, 7.6.2, 7.7.1, 7.7.3.

d) Test Type: Capability

A.1.3 GetRecordById for DGIWG Basic CSW

a) Test Purpose: Verify that the server implements DGIWG the following DGIWG requirements (Requirement 8, Requirement 9, Requirement 10).

b) Test Method:

- Ensure that the CSW is loaded with metadata which supports all of the returnables described in table 5, 6, 8, 9 and 10.
- Issue HTTP POST GetRecordById requests with return types of both csw:Record and gmd:MD_Metadata Verify that a valid result is obtained (Requirement 10).
- Verify that all metadata returnables are present in the result (Requirement 13).
- Verify that the gmd:MD_Metadata record returned is compliant with the DMF specification (Requirement 11) and with ISO19139 (Requirement 12). Returnables shall be mapped to the DMF using table 5, 6, 8, 9 and 10 (Requirement 10).

c) References: Sections 7.3, 7.4, 7.5, 7.6.3, 7.7.1, 7.7.3.

d) Test Type: Capability

A.1.4 DGIWG Transactional CSW

a) Test Purpose: Verify that the server implements DGIWG the following DGIWG requirements (Requirement 18)

b) Test Method:

- Issue an HTTP GET GetCapabilities Operation. Verify that the Abstract present in the service metadata includes the text defined in requirement 19.
- Issue a HTTP POST CSW INSERT operation with DMF Compliant Metadata. Issue a HTTP POST GetRecords Request to confirm the item was inserted (Requirement 18).
- Issue a HTTP POST Update Operation with a revised DMF Compliant metadata file.
- Issue a HTTP POST GetRecords Request to confirm the item was updated (Requirement 18).
- Issue a HTTP POST Delete Operation with a revised DMF Compliant metadata file.
- Issue a HTTP POST GetRecords Request to confirm the item was deleted (i.e. no records returned) (Requirement 18).

c) References: Section 7.

d) Test Type: Capability

A.1.5 DGIWG Transactional CSW

a) Test Purpose: Verify that the server implements DGIWG the following DGIWG requirements (Requirement 17)

b) Test Method:

- Issue a HTTP POST CSW INSERT operation with DMF Compliant Metadata.
- Issue a HTTP POST GetRecords Request to confirm the item was inserted (Requirement 17).
- Issue a HTTP POST Update Operation with a revised DMF Compliant metadata file.
- Issue a HTTP POST GetRecords Request to confirm the item was updated (Requirement 17).
- Issue a HTTP POST Delete Operation with a revised DMF Compliant metadata file.
- Issue a HTTP POST GetRecords Request to confirm the item was deleted (i.e. no records returned) (Requirement 17).
- Issue a HTTP POST Harvest Request and confirm that all records are returned (Requirement 18).

c) References: Sections 8.4.

d) Test Type: Capability