USGIN
U.S. Geoscience Information Network

USGIN Metadata Profile: Use of ISO CI_OnlineREsource

Version 1.2 draft

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USGIN Metadata Profile: Use of ISO metadata specifications to describe geoscience information resources, extracted section on CI_OnlineResource

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Description:

This document describes recommended practices for using ISO19139 xml encoding of ISO 19115 and ISO 19119 metadata to describe a broad spectrum of geoscience resources. The document provides guidance for the population of ISO19139 encoded metadata documents to enable interoperability of catalog service clients with multiple servers conforming to this profile.

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…much of document deleted; only material on CI_OnlineResource included…

1.1 CI_OnlineResource

The CI_OnlineResource element is used in a variety of contexts in ISO19115 content (see Table 1). This complex-content-element provides a linkage to some online resource related to the metadata or the described context resource. It is thus analogous to atom:link (IETF RFC-4287) or the link element described in IETF RFC-5988. For links that locate online documents accessible using standard browser and file type resolution technology, the link can be as simple as a single URL element that retrieves a representation of the resource. There are many other kinds of related resources that the onlineResource element may point to, including web services that provide access to a dataset resource, metadata for related or source resources, specifications for standards or extensions to standards.

Table 1. Contexts for CI_OnlineResource elements

Context	usage
contactInfo/onlineResource	Link to online resource to assist contacting a referenced individual or organization.
distributionInfo/transferOptions	link to a representation of the resource that is the subject of the metadata record
metadataExtension	link to document describing specifications for elements and attributes extending the base standard.

For the USGIN, it is desired that such links are accompanied by sufficient description that the linked resource can be accessed and provided to the metadata user automatically, with little or no operator intervention other than clicking on a link in a presentation of the metadata. A content specification for such machine-actionable links is discussed in a separate USGIN discussion paper. This approach essentially considers the metadata as a sort of hypermedia in which the CI_OnlineResource elements define the 'affordances', or actions that are available to a client.

The CI_OnlineResource element contains 6 child elements. The only required content is a URL that will access the online resource. All other properties are optional. The `protocol`, `application-`

`Profile`, `name` and `description` properties are all free text with loosely defined semantics as indicated by the element names.

1.1.1 CI_OnlineResource protocol

Since the base level web locator scheme (ftp, http) is indicated by the prefix of the URL (IETF RFC 1738), USGIN metadata uses the `protocol` attribute to specify a higher-level protocol in the network stack, e.g. a serviceType for data accessed through remote-procedure-call-on-HTTP type services.

1.1.2 CI_OnlineResource applicationProfile

Resource distributor online distribution application profile (O) `distributionInfo/-MD_Distribution/-transferOptions/-MD_DigitalTransferOptions/-online/CI_OnlineResource/-applicationProfile`	C-O	`applicationProfile` is mandatory if the `CI_OnlineResource/linkage` does not connect to an HTML web page (or other standard format that will be recognized by web browsers), if another software application is needed to use a linked file resource, or the target resource is a service instance conforming to a profile. The `applicationProfile` character string should specify the software using the following recommended syntax: "vendor:application name/application version", e.g. "Microsoft:Word/2007", or "ESRI:ArcGIS/9.3". For links to documents for which the service type and base protocol prefix on the link URL do not provide sufficient information to guide client software, the applicationProfile property is used to indicate a profile on the serviceType or some variation in document encoding or content conventions. See section 1.1 CI_OnlineResource for more explanation.

The use of `applicationProfile` for file-based resources accessed via URL is discussed above. For links to documents for which the service type (encoded in the `CI_OnlineResource/protocol` property) and base protocol prefix in the `CI_OnlineResource/link` URL (e.g. 'http:') do not provide sufficient information to guide client software, the `applicationProfile` property is used to indicate a profile on the serviceType or some variation in document encoding or content conventions. For example WFS services may offer different features in different namespaces or encoding schemes, a catalog may offer different metadata encoding, or a resource-oriented service may offer representations using different encoding schemes. The same scheme may be used with different conventions, for instance different profiles for the use of ISO19139 or csw:record XML metadata encoding. RDF representations may be offered in XML, Turtle, or N3 encoding. Although these variations may be deducible using content negotiation or by accessing and parsing a service description document, much simple client logic is possible if the information is provided up front with the link. The actual string value that should be provided to specify an application profile should be defined by the agent originating the profile.

1.1.3 CI_OnlineResource name and description

In order to provide further clarity and guidance for the utilization of linked resources USGIN recommends use of the `CI_OnlineResource/name` property as indicated in **Error! Reference source not found.**.

Table 2. USGIN Names to identify special linkage URL's for CI_Online Resource. CodeList URI = http://resources.usgin.org/registry/linkageName201001

Identifier	Name (eng)	Usage
icon	Icon	linkage url is link to a thumbnail icon. Icon pixel height and width range?
serviceDescription	web service description	linkage url is link to getCapabilities or WSDL that describes a service using a formal syntax such that computer programs can automate connection to the service. OnlineFunctionCode for CI_OnlineResource should be 'Information'
baseURL	web service endpoint	Base url for service. Assumes that ServiceType specifies a well know service type such that requests can be constructed without significant additional information. OnlineFunctionCode for CI_OnlineResource should be 'webService'
serviceClient	web application	URL is linkage to a web application that allows the user to access the service. OnlineFunctionCode for CI_OnlineResource should be 'Browsing'
webpage	access information	URL locates a web page with instructions for accessing the service. This provides the user with information to implement a connection to the service, but does not enable automated service access. OnlineFunctionCode for CI_OnlineResource should be 'Information'
~~serviceMetadata~~	~~Service Metadata~~	~~linkage URL is link to a complete service metadata record. Use for distribution linkage to a service for which more information that can be provided by the CI_OnlineResource element is necessary to successfully automate access to the context resource through the service. OnlineFunctionCode for CI_OnlineResource should be 'Information'~~
download		
email request		

offline access		

Example usage:

```xml
<gmd:CI_OnlineResource>
  <gmd:linkage>
    <gmd:URL>http://75.101.143.247:8080/gsvr/wms?SERVICE=WMS&amp;REQUEST=getCa
    pabilities</gmd:URL>
  </gmd:linkage>
  <gmd:protocol>
    <gco:CharacterString>OGC:WMS</gco:CharacterString>
  </gmd:protocol>
  <gmd:name>
    <gco:CharacterString xsi:type="gml:CodeType"
    codeSpace="http://resources.usgin.org/registry/linkageName201001">
    serviceDescription</gco:CharacterString>
  </gmd:name>
</gmd:CI_OnlineResource>
```

Use of such controlled vocabulary can be indicated by using xsi:type on the gco:characterString element to make the type gml:CodeType, which then requires a codeSpace attribute. The distribution format Identifier from Table 6 should be used as the element value. For compatibility with systems that can not process this encoding, the code identifier should be included as the element value as well as the codeListValue.

In order to identify the linkage element that locates the service description document, USGIN mandates using `CI_OnlineResource/name` = "serviceDescription" in the `CI_OnlineResource` element with the linkage to the service description. The assumption is that any client that can connect to the service will know what to expect as the service description provided by that service.

The `description` property may be used to provide information about the online resource, and more usefully, to provide an explanation of how the other content of the `CI_OnlineResource` element is to be used to access the resource. The `linkage/description` should provide any necessary additional information in a text narrative as well. In some cases the protocol, application-Profile and name properties may be insufficient to enable machine access to the resource through the provided link. The `CI_OnlineResource/description` element may include key values pairs to provide additional necessary information. USGIN recommendataion is to encode these in a 'parameter' object using JSON syntax. The parameters value is a list of key:value pairs enclosed in curly brackets ('{key:"value", key1:"value1"…}'). The keys should be the exact string that is required for the data access request parameter. For example, a dataset distributed through a particular layer in a multi-layer WMS:

```xml
<gmd:description>
  <gco:CharacterString>
    Whatever descriptive text you want.
    parameters:{layers:"gtp_datagap_well_data_collection"}
  </gco:CharacterString>
</gmd:description>
```

In the case of a dataset distributed through a particular feature type in a multi-feature WFS:

```
<gmd:description>
  <gco:CharacterString>
    Whatever descriptive text you want.
    parameters:{ typeName:"BoreholeLithInterval2.0"}
  </gco:CharacterString>
</gmd:description>
```

1.1.4 CI_OnlineResource function property

The `function` property is populated from a codelist (see Table 8) and is used to indicate the expected action that actuating the link will trigger. (see section **Error! Reference source not found.** *Error! Reference source not found.*).

Table 3. OnlineFunctionCode values from NAP (INCITS 453) and ISO 19115. '(ISO)' after the text in column 2 indicates function codes from ISO19115 (2006).

OnLineFunctionCode	USGIN profile usage
browsing	`CI_OnlineResource/linkage` is a valid URL for a web application that enables user to explore and seek information about the resource from a Web browser
download	`CI_OnlineResource/linkage` is a valid URL that will initiate transfer of a file containing the described resource to the local system. (ISO)
emailService	`CI_OnlineResource/linkage` is a valid mailto: link that will initiate an e-mail message to the correct party to request access to the described resource. (NAP)
information	`CI_OnlineResource/linkage` is a valid URL that will access a resource that provides information about the resource content, for example an explanatory web page, a downloadable document with narrative text describing the resource, or an XML encoded metadata document. (ISO)
offlineAccess	`CI_OnlineResource/linkage` is a valid URL that will access a web page providing instructions for requesting the resource from the provider. (ISO)
order	`CI_OnlineResource/linkage` is a valid URL that will access a web page to initiate an ordering process for obtaining the resource. (ISO)
search	`CI_OnlineResource/linkage` is a valid URL that will access a search interface for seeking out specific information content contained by resource, e.g. the metadata describes a database, and this linkage accesses a search interface to search the database (ISO)
upload	`CI_OnlineResource/linkage` is a valid URL for a web interface to transfer data from a local storage device or system to be included in the described resource. (NAP)

OnLineFunctionCode	USGIN profile usage
webService	`CI_OnlineResource/linkage` is a URL that accesses a standard web service. If the `CI_OnlineResource/name` is 'ServiceDescription' then the link is to a machine-readable standard service description document as defined by the service specification. Example description document may be a Web Services Description Language (WSDL) file or OGC getCapabilities file. (NAP)

1.1.5 Scoped name in service distributions

A distribution option for a dataset might be through a Web Map Service that contains one or more layers portraying the described dataset, along with layers portraying other datesets. Likewise, a dataset may be distributed as a particular feature type in a Web Feature Service that offers multiple features. Analogous internal knowledge may be required for various other service protocols. To completely specify access to the correct data representation requires knowing the layer name, feature type name, or some other information in addition to the base service connection information provided by the existing properties. USGIN recommended practice for this common situation is to include a parameters section in the `linkage/description` (see 4.16.3 CI_OnlineResource name and description, above).