

FÓRUM Padrões OGC

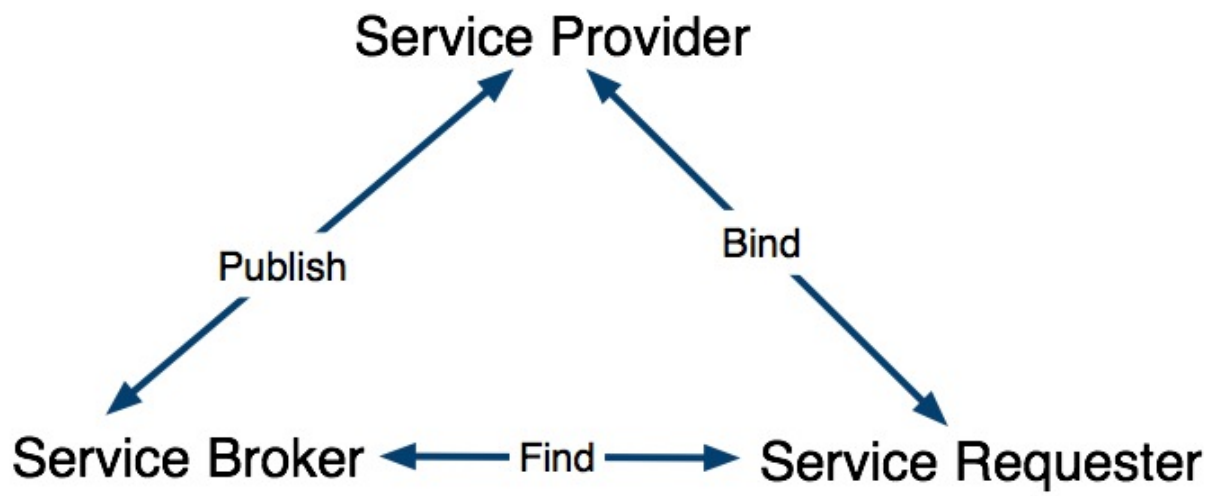


Padrões OGC: WFS, WMS, WCS, CSW, SWE

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OGC Web Services



OGC Services

WFS

Web Feature Service



publish

access

manipulations of
geographic Features

Popular WFS Clients

uDig – Desktop-based, free, open source, based of Geotools, Java.

QGIS – Desktop-based, free, open source, based on Qt.

ArcGIS – Desktop-based, popular in Industry, powerful.

USGS Framework Web Feature Services

frameworkwfs.usgs.gov USGS Framework Web Feature Services

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USGS Framework Web Feature Services

USGS Framework Web Feature Services

The Framework Web Feature Services are offered by the [United States Geological Survey \(USGS\)](#) in support of the development of the [National Spatial Data Infrastructure \(NSDI\)](#). Selected Framework data themes were redeployed by the USGS from their native database formats to services that conform to the Open Geospatial Consortium's (OGC) Web Feature Service (WFS) and Geography Markup Language for Simple Features (GML) specifications and the FGDC/ANSI Geographic Information Framework Data Content Standards. These services provide query and retrieval of specific Framework features and their attributes into a form usable for analysis in Geographic Information Systems (GIS). In addition, a Web Map Service (WMS) is provided to allow users to visualize the data content as a graphical image.

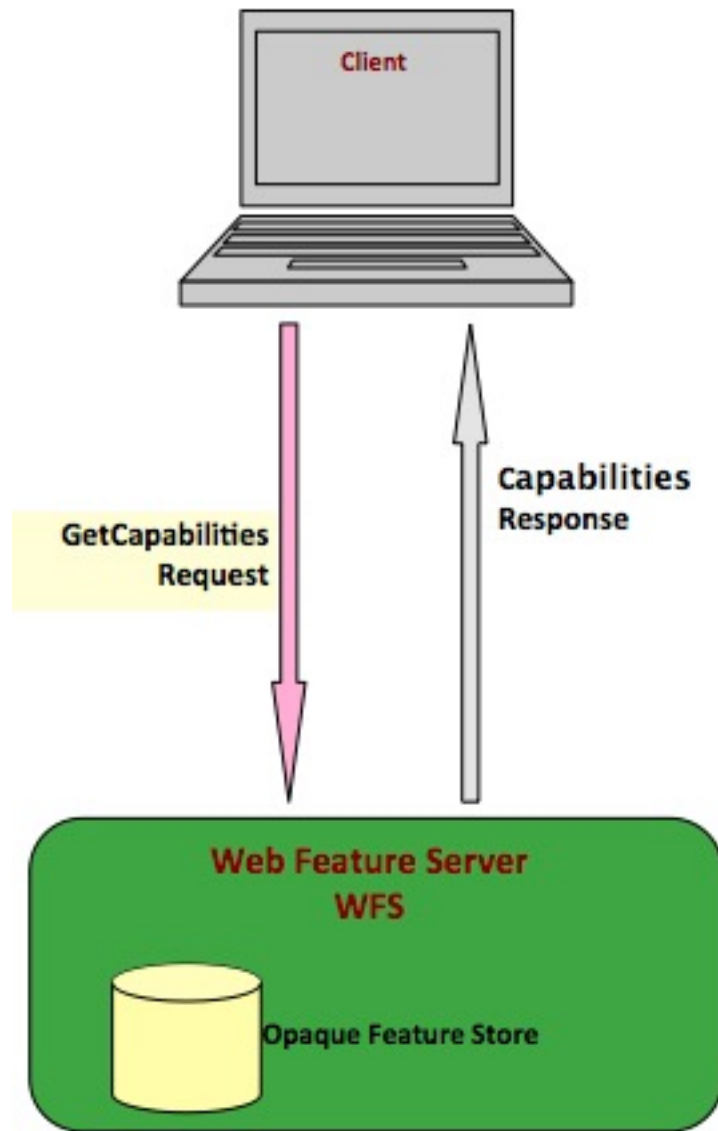
The initial data content for the NSDI Framework Data Services includes selected features from the Hydrography, Transportation and Governmental Unit Framework Data Themes. In addition, the NSDI Framework Data Services includes a [Prototype WFS Gazetteer \(WFS-G\)](#) consistent with ISO 19112 and GMLsf Level 0 and Level 1.

Please see the links below for information regarding service access, suggested usability guidelines, information schemas, specifications and free clients & utilities. Currently, an understanding of OGC Web Services Standards is important for the effective utilization of the NSDI Framework Data Services. Therefore; it is strongly recommended that users read the Usability Document before using the service. It not only includes general guidelines, but also instructions specific to the use of the service in clients such as Google Earth and the Gaia platform.

SERVICE ACCESS

WFS Services:	http://frameworkwfs.usgs.gov/framework/wfs/wfs.cgi
WMS Services:	http://frameworkwfs.usgs.gov/framework/wms/wms.cgi

WFS Get Capabilities Request

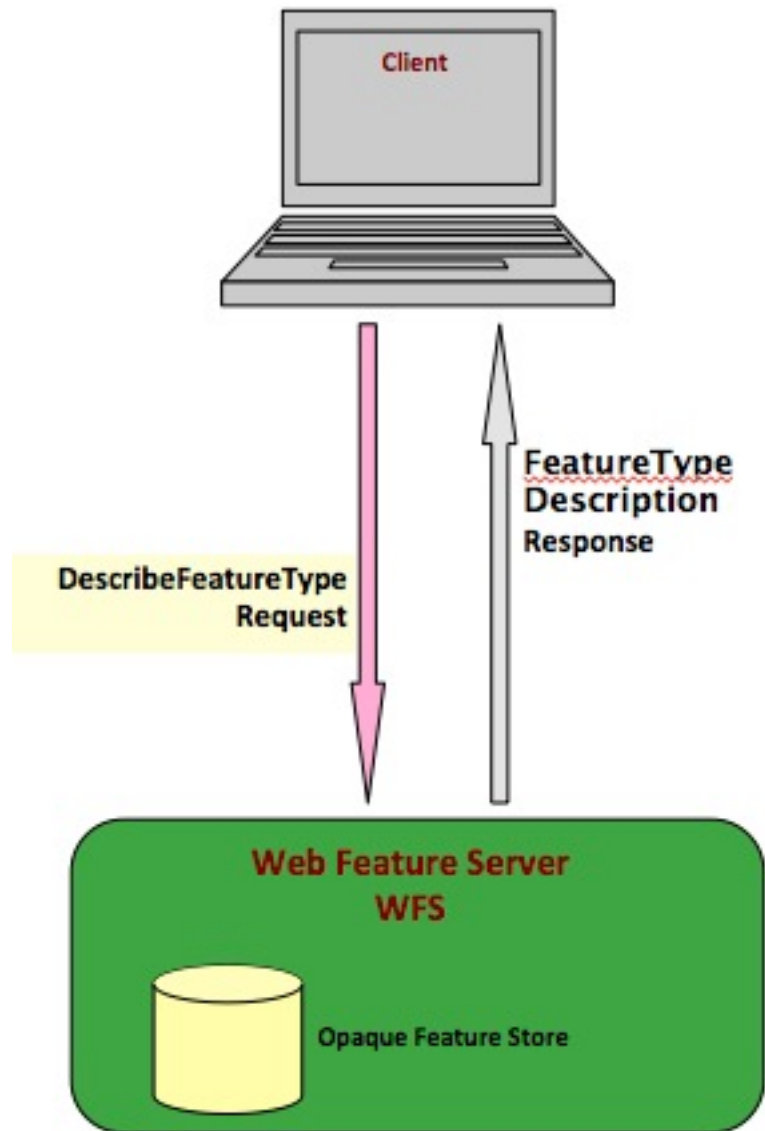


```
http://frameworkwfs.usgs.gov/  
framework/wfs/wfs.cgi?  
service=wfs&  
version=1.1.0&  
request=GetCapabilities
```


WFS Get Capabilities Response

- * Service Identification
- * Service Provider
- * Operations Metadata
- * Feature Type List
- * Filter Capabilities

WFS Describe Feature Type



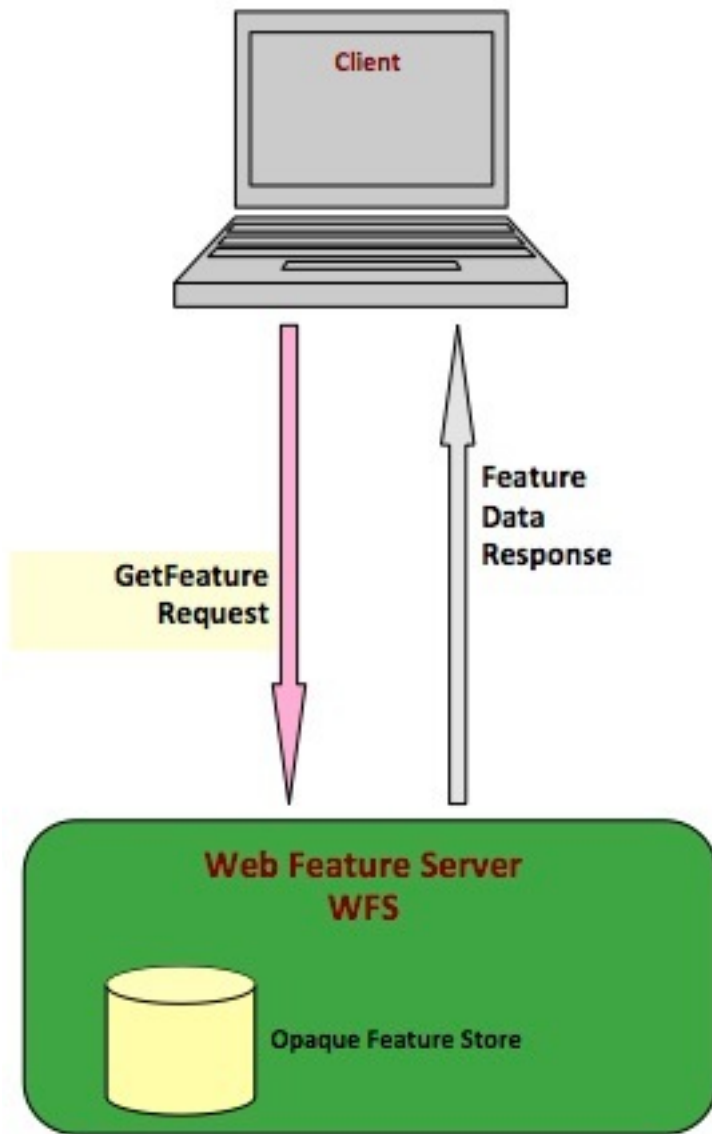
```
http://www.example.com/wfsserver?  
service=wfs&  
version=1.1.0&  
request=DescribeFeatureType&  
typeName=namespace:featuretype
```

WFS DescribeFeature Response

```
<xs:complexType name="GovernmentalUnitCEType">
  <xs:complexContent>
    <xs:extension base="gml:AbstractFeatureType">
      <xs:sequence>
        <xs:element name="unitId"
type="fw:IdentifierPropertyType"/>
        <xs:element name="typeAbbreviation"
type="xs:string" minOccurs="0"
maxOccurs="1"/>
        <xs:element name="instanceName" type="xs:string"/
>
        <xs:element name="instanceAlternateName"
type="xs:string"
minOccurs="0" maxOccurs="unbounded"/>
        ....

```

WFS GetFeature



```
http://www.example.com/wfsserver?  
service=wfs&  
version=1.1.0&  
request=GetFeature&  
typeName=namespace:featuretype&  
featureID=feature
```

WFS GetFeature Response

```
<gml:featureMember>
  <gubs:GovernmentalUnitCE
gml:id="CWFID.GOVUNIT_CE.0.0">
  <gubs:unitId>
    <fw:Identifier>
      <fw:identifier>e64b1841-57d3-4f6a-af04-
bc011024ad98</fw:identifier>
      <fw:idAuthority>US Census Bureau</
fw:idAuthority>
      </fw:Identifier>
    </gubs:unitId>
    ...
    <gubs:instanceName>Kauai</gubs:instanceName>
    <gubs:instanceCode>007</gubs:instanceCode>
    <gubs:effectiveDate>2005-11-07</
gubs:effectiveDate>
    ...
```

WFS GetFeature Properties

- * **typeName** – feature types
- * **featureID** – identifier of the feature (gml:id).
- * **outputFormat** – return format (e.g. gml/3.1.1)
- * **resultType** – Controls results processing
 - * **results** – complete response,
 - * **hits** – limits the results.
- * **maxFeatures** – limits the features delivered
- * **srsName** – Spatial Reference System (e.g. EPSG:4326)

WFS GetGMLObject

If we have:

```
<sf:PrimitiveGeoFeature ...">  
  <gml:name>My House</gml:name>  
  ...  
  <sf:pointProperty>  
    <gml:Point gml:id="point.1">  
      <gml:pos>12 34</gml:pos>  
    </gml:Point>  
  </sf:pointProperty>  
  ...  
</sf:PrimitiveGeoFeature>
```

WFS GetGMLObject

We can query:

```
<wfs:GetGmlObject xmlns:wfs="http://www.opengis.net/
wfs" xmlns:ogc="http://www.opengis.net/ogc"
  version="1.1.0" service="WFS">
  <ogc:GmlObjectId>point.1 </ogc:GmlObjectId>
</wfs:GetGmlObject>
```


WFS GETGMLObject

We get:

Power Queries using Filter Encoding

Assume:

```
<myns:Person SIN="111222333" ... >
  <myns:lastName>Smith</myns:lastName>
  <myns:age>35</myns:age>
  <myns:sex>Male</myns:sex>
  <myns:spouse SIN="444555666" />
  <myns:location>
    <gml:Point><gml:pos>15 15</gml:pos></gml:Point>
  </myns:location>
</myns:Person>
```

Power Queries using Filter Encoding

```
<myns:Person SIN="111222333" ... />
```

```
<myns:lastName>Smith</myns:lastName>
```

****XPATH****

Person/@SIN = 111222333

Person/lastName = Smith

Power Queries using Filter Encoding

```
<myns:Person SIN="111222333" ...>  
  <myns:lastName>Smith</myns:lastName>  
  ..  
</myns:Person>
```

```
<?xml version="1.0" ?>  
  <GetFeature  
    version="1.1.0"  
    service="WFS"  
    ...">  
    <Query typeName="myns:Person">  
      <wfs:PropertyName>myns:Person/myns:lastName</  
wfs:PropertyName>  
    </Query>  
  </GetFeature>
```

Power Queries using Filter Encoding

```
<Query typeName="myns:ROADS">
  <wfs:PropertyName>myns:path</wfs:PropertyName>
  <wfs:PropertyName>myns:lanes</wfs:PropertyName>
  <wfs:PropertyName>myns:surfaceType</wfs:PropertyName>
  <ogc:Filter>
    <ogc:Within>
      <ogc:PropertyName>myns:path</ogc:PropertyName>
      <gml:Envelope srsName="EPSG:63266405">
        <gml:lowerCorner>50 40</gml:lowerCorner>
        <gml:upperCorner>100 60</gml:upperCorner>
      </gml:Envelope>
    </ogc:Within>
  </ogc:Filter>
</Query>
```

Compatibility WFS - FE - GML Versions

WFS 2.0 - GML 3.2.1 - FES 2.0

WFS 1.1.0 - GML 3.1.1 - FE 1.1.0 - SF 1.0

FE = Filter Encoding

SF = Simple Features

Lets Have Fun with WFS

Inspect GetCapabilities

1. Open [<http://frameworkwfs.usgs.gov/framework/wfs/wfs.cgi?service=wfs&version=1.1.0&request=GetCapabilities>] (<http://frameworkwfs.usgs.gov/framework/wfs/wfs.cgi?service=wfs&version=1.1.0&request=GetCapabilities>)
2. Who should you contact if you have questions about the service or data ?
3. Which state is he from ?
4. What are the accepted versions of this WFS ?

Lets Have Fun with WFS

* Can you invoke a WFS 2.0.0 request ? What should happen ?

* How many feature type are supported ? * What is a *trans:RoadSeg*? * Is GML 2 supported ?

Lets Have Fun with WFS

- * How about GML 3 simple features level 1? *
- * Are the output formats for DescribeFeatureType and GetFeature operations the same? What are the differences ? *
- * Is the reference system based on WGS84 supported
- * This the WFS supports SOAP ?

Lets Have Fun with WFS

* If you are interested in getting all the names of the counties that are nearby Montgomery County (in Maryland), what SpatialOperator should you use ?

* What are the properties of `gubs:GovernmentalUnitCEType`

* What is the first feature retrieved by the server ?

* How many states have a population over 15 Million ?
(Florida, New York, Texas, California)

WMS

WMS - What For ?



- * Produce a Map
- * Answer queries about content of the map

WMS GetCapabilities

[http://webservices.nationalatlas.gov/wms?
service=WMS&
request=GetCapabilities&
version=1.1.1](http://webservices.nationalatlas.gov/wms?service=WMS&request=GetCapabilities&version=1.1.1)

WMS GetCapabilities Response

- * How to invoke GetMap
- * Types of exceptions
- * List of layers

WMS GetMap

[http://webservices.nationalatlas.gov/wms?](http://webservices.nationalatlas.gov/wms?service=wfs&version=1.1.1&request=GetMap)
service=wfs&
version=1.1.1&
request=GetMap &
otherParameters..

WMS GetMap Parameters

* **layers** = layer list separated by comma (e.g. land, station, rivers, etc..)

* **srs** = coordinate reference system. Used in 1.1.0 and 1.1.1. For example EPSG:4326

* **crs** = coordinate reference system. Used in 1.3.0. For example EPSG:4326

* **bbox** = minx,miny,maxx,maxy.

* **width** =output width for the map being returned

* **height** =output height for the map being returned

* **format=output_format** =output format for the map being returned. (e.g. png)

WMS GetMap

<http://webservices.nationalatlas.gov/wms?>

SERVICE=WMS&

REQUEST=GetMap&

VERSION=1.1.1&

FORMAT=PNG&

WIDTH=300&

HEIGHT=425&

SRS=EPSG:4326&

BBOX=-125,31,-110,50&

LAYERS=seihaz,states

WMS GetFeatureInfo

Response to a GetFeatureInfo Request

Results for FeatureType 'states':

```
-----  
the_geom = [GEOMETRY (MultiPolygon) with 153 points]  
STATE_NAME = Arizona  
STATE_FIPS = 04  
SUB_REGION = Mtn  
STATE_ABBR = AZ  
LAND_KM = 294333.462  
WATER_KM = 942.772  
PERSONS = 3665228.0  
FAMILIES = 940106.0  
HOUSHOLD = 1368843.0  
MALE = 1810691.0  
FEMALE = 1854537.0  
WORKERS = 1358263.0  
DRVALONE = 1178320.0  
CARPOOL = 239083.0  
PUBTRANS = 32856.0  
EMPLOYED = 1603896.0  
UNEMPLOY = 123902.0  
SERVICE = 455896.0  
MANUAL = 185109.0  
P_MALE = 0.494  
P_FEMALE = 0.506  
SAMP_POP = 468178.0  
-----
```

```
http://server?  
version=1.1.1&  
request=getfeatureinfo&  
layers=topp:states&  
styles=population&  
SRS=EPSG:4326&  
bbox=-125,24,-67,50&  
width=400&  
height=200&
```

format=text/html&
X=100&y=100&
query_layers=topp:states

National Atlas WMS

gle.com/search?q=national+atlas+ ☆ ▾ ↻  national atlas wms 🔍

About 32,400 results (0.15 seconds)

[Technical Information About the National Atlas Web Map Service](#)

nationalatlas.gov/infodocs/ogcwms.html

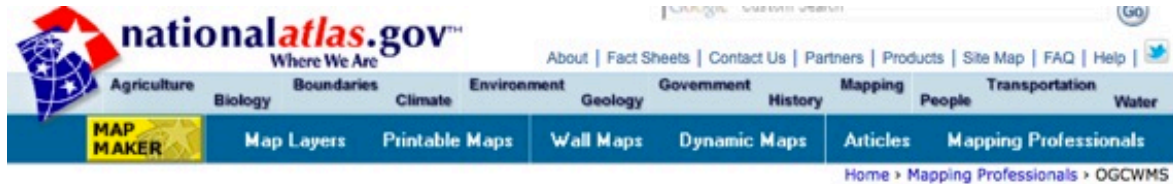
10+ items – Web Mapping Service instructions for **nationalatlas.gov**.

Category URL

Agriculture [http://webservices.nationalatlas.gov/wms/agriculture?SERVICE ...](http://webservices.nationalatlas.gov/wms/agriculture?SERVICE...)

Biology [http://webservices.nationalatlas.gov/wms/biology?SERVICE ...](http://webservices.nationalatlas.gov/wms/biology?SERVICE...)

National Atlas WMS



Technical Information About the National Atlas Web Map Service

These instructions are for Web map services (WMS) consumers who want to connect to nationalatlas.gov™ using Open Geospatial Consortium (OGC) protocols for interoperability and access. Anyone can connect to the National Atlas of the United States® by supplying valid OGC parameter values to our Web services uniform resource locator (URL).

An [Introduction to National Atlas Web Map Services](#) is also available.

Accessing the Capabilities File

The National Atlas WMS currently contains over 2,400 individual layers. A single capabilities file for all layers is available, but because it is quite a large file, we have also grouped the layers into broad categories that correspond to the chapters of the National Atlas. Use the online addresses in Table 1 to access the capabilities file for the categories of interest to you.

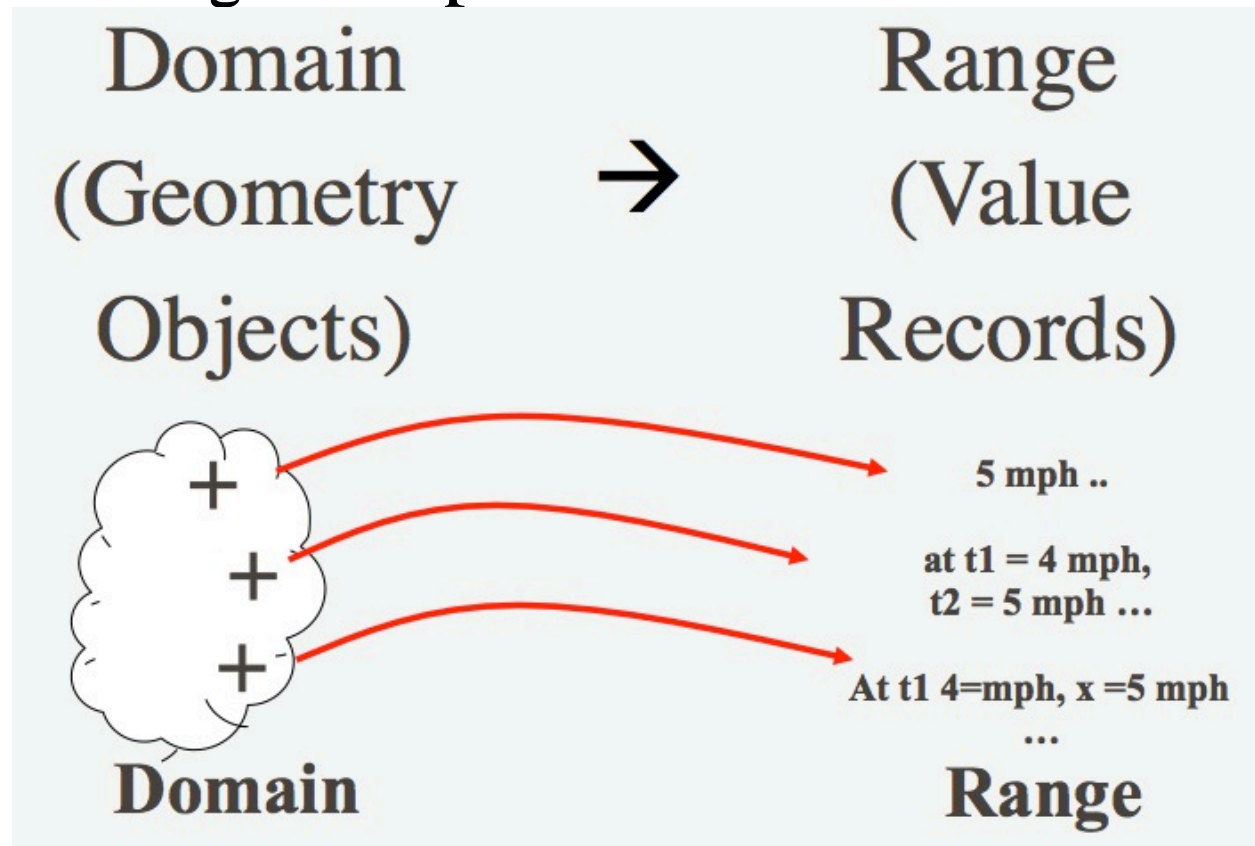
Category	URL	Size
Agriculture	http://webservices.nationalatlas.gov/wms/agriculture?SERVICE=WMS&REQUEST=GetCapabilities	31 KB
Biology	http://webservices.nationalatlas.gov/wms/biology?SERVICE=WMS&REQUEST=GetCapabilities	1.55 MB
Boundaries	http://webservices.nationalatlas.gov/wms/boundaries?SERVICE=WMS&REQUEST=GetCapabilities	10 KB
Climate	http://webservices.nationalatlas.gov/wms/climate?SERVICE=WMS&REQUEST=GetCapabilities	78 KB
Environment	http://webservices.nationalatlas.gov/wms/environment?SERVICE=WMS&REQUEST=GetCapabilities	9 KB
Geology	http://webservices.nationalatlas.gov/wms/geology?SERVICE=WMS&REQUEST=GetCapabilities	51 KB
History	http://webservices.nationalatlas.gov/wms/history?SERVICE=WMS&REQUEST=GetCapabilities	11 KB
Map Reference	http://webservices.nationalatlas.gov/wms/map_reference?SERVICE=WMS&REQUEST=GetCapabilities	11 KB
People	http://webservices.nationalatlas.gov/wms/people?SERVICE=WMS&REQUEST=GetCapabilities	454 KB
Transportation	http://webservices.nationalatlas.gov/wms/transportation?SERVICE=WMS&REQUEST=GetCapabilities	9 KB
Water	http://webservices.nationalatlas.gov/wms/water?SERVICE=WMS&REQUEST=GetCapabilities	144 KB
All Layers	http://webservices.nationalatlas.gov/wms?SERVICE=WMS&REQUEST=GetCapabilities	2.30 MB

WMS Exercise

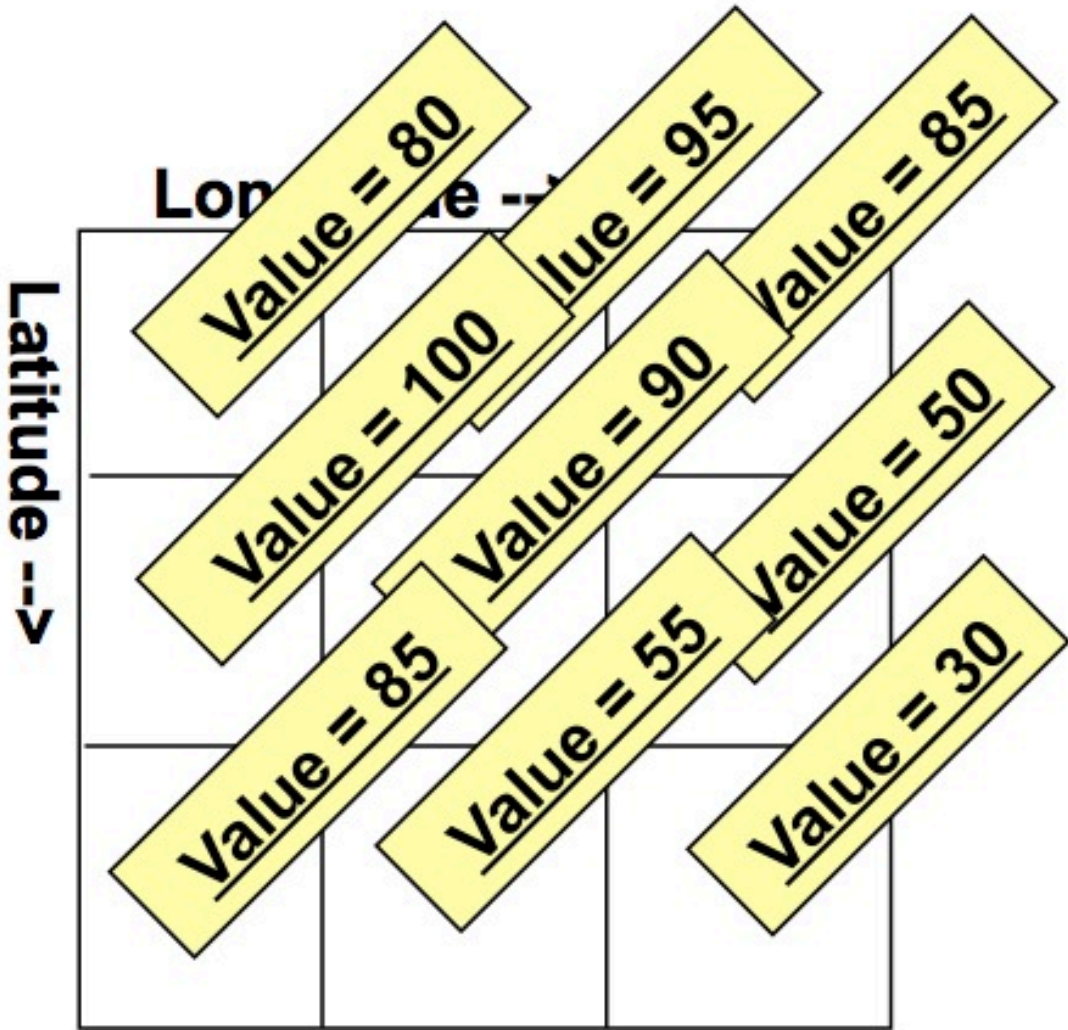
Create a toxic Release Map for Florida from the National Atlas.

WCS

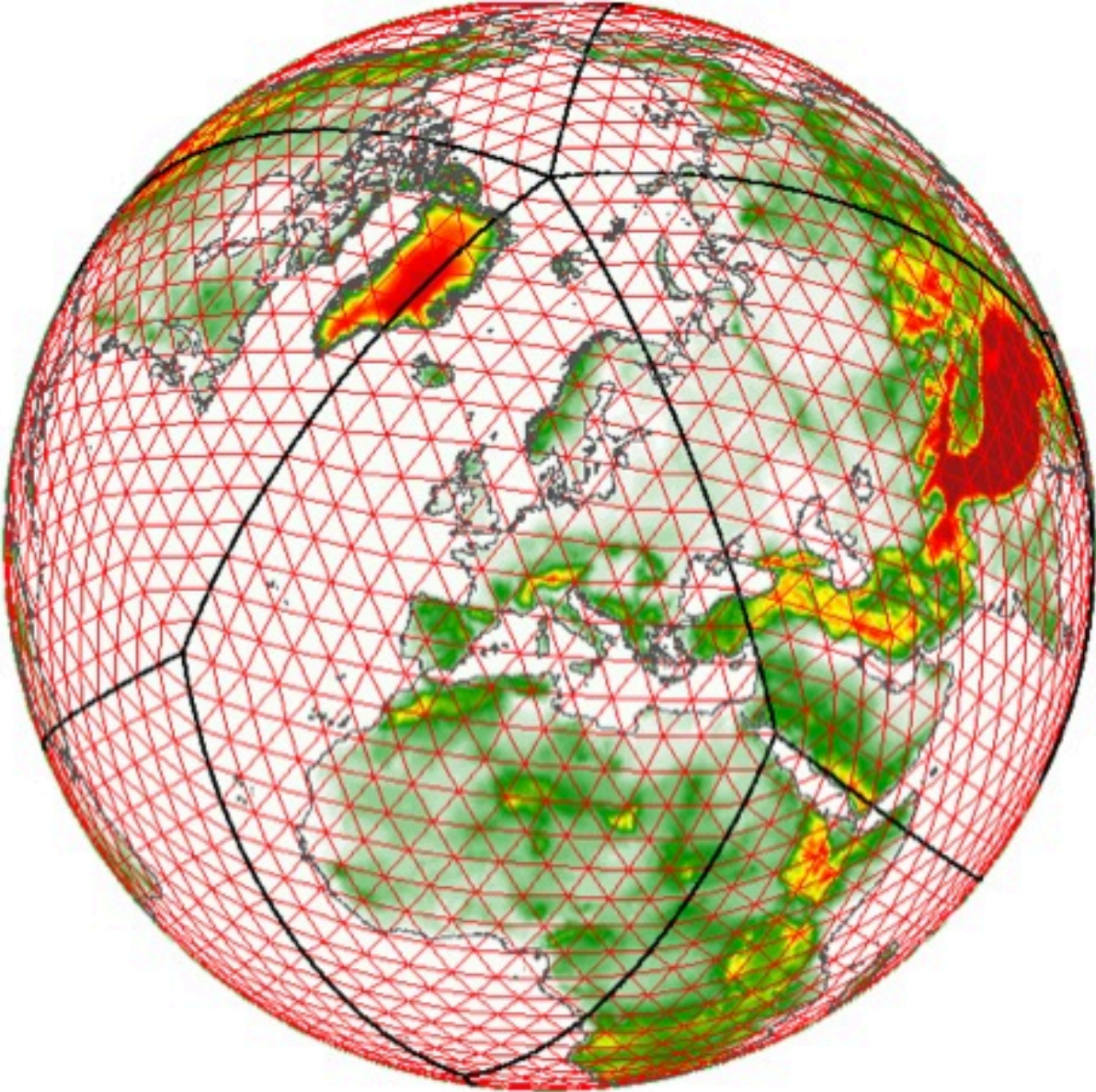
Coverages are spatial functions



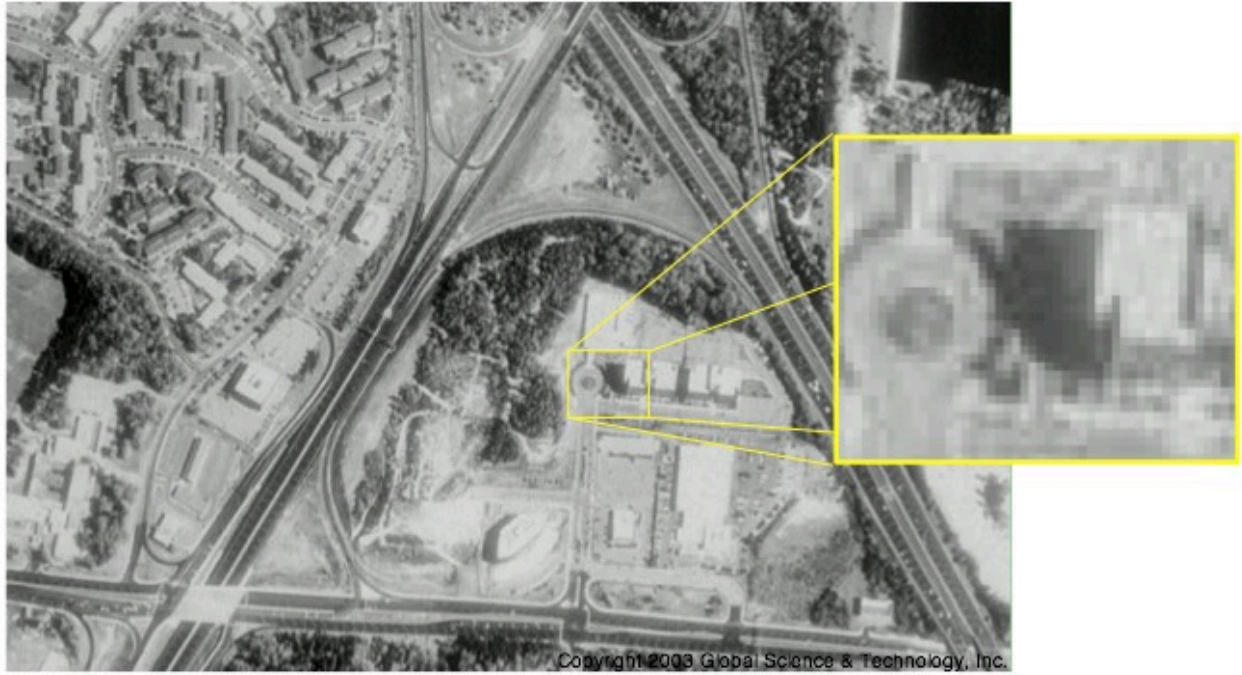
Coverages - Rasters



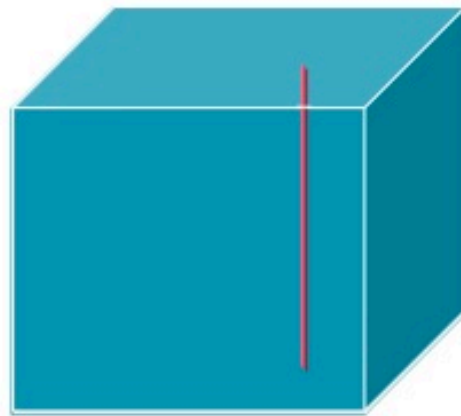
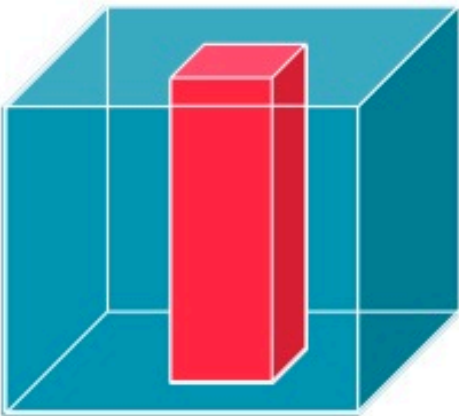
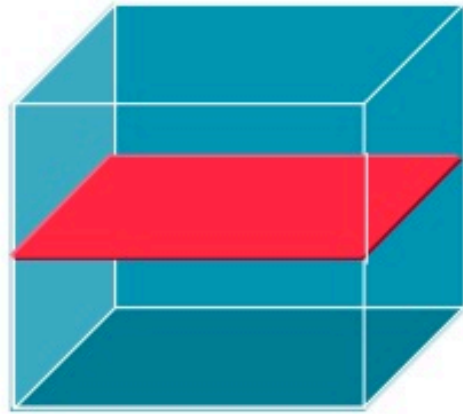
Coverages - Gridded Data



Coverages - Space time varying phenomena



Coverage subsetting



Web Coverage Service (WCS)

standard interface

enables interoperable access to
geospatial coverages

WMS returns images

WCS returns the data (e.g. GeoTiff)

WCS GetCapabilities

http://myServer?
service=WCS&
version=1.1.1&
request=getCapabilities

WCS GetCapabilities - Service

Identification

```
<?xml version="1.0" encoding="ISO-8859-1"?>
  <Capabilities xmlns="http://www.ope...">

    <ows:ServiceIdentification>
      <ows:Title>Atlas of the Cryosphere: Northern
Hemisphere</ows:Title>
      <ows:Abstract>The National Snow and Ice Data
Center (NSIDC) Atlas of the Cryosphere is a map server that
provides data and information pertinent to the frozen regions
of Earth, including monthly climatologies
      ....
    </ows:Abstract>
    <ows:Keywords>
      ....
    </ows:Keywords>
    <ows:ServiceType codeSpace="OGC">OGC WCS</
ows:ServiceType>
    <ows:ServiceTypeVersion>1.1.1</
ows:ServiceTypeVersion>
    <ows:Fees>none</ows:Fees>
    <ows:AccessConstraints>none</
ows:AccessConstraints>
```

</ows:ServiceIdentification>

WCS GetCapabilities - Service Provider

```
<ows:ServiceProvider>

    <ows:ProviderName>National Snow and Ice Data
Center</ows:ProviderName>
    <ows:ProviderSite xlink:type="simple"
xlink:href="http://nsidc.org"/>
    <ows:ServiceContact>
        <ows:IndividualName>NSIDC User Services</
ows:IndividualName>
        <ows:PositionName>User Services</
ows:PositionName>
        <ows:ContactInfo>
            .....
            </ows:Address>
            <ows:OnlineResource xlink:type="simple"
xlink:href="http://nsidc.org"/>
            <ows:HoursOfService>Our hours of operation are
9:00 A.M. to 5:00 P.M., U.S. Mountain Time, Monday
through Friday. We are closed on most major United States
holidays.</ows:HoursOfService>
            <ows:ContactInstructions>None.</
ows:ContactInstructions>

        </ows:ContactInfo>
```

```
<ows:Role>resourceProvider</ows:Role>  
</ows:ServiceContact>  
</ows:ServiceProvider>
```


WCS GetCapabilities - Describe Coverage

```
<ows:Operation name="DescribeCoverage">
  ...
  <ows:Parameter name="identifiers">
    <ows:Value>sea_ice_concentration_01</ows:Value>
    <ows:Value>seasonal_snow_classification</
ows:Value>
    <ows:Value>snow_extent_01</ows:Value>
    <ows:Value>snow_water_equivalent_01</
ows:Value>
    <ows:Value>greenland_surface_melt</ows:Value>
    <ows:Value>greenland_accumulation</ows:Value>
    <ows:Value>greenland_bedrock_elevation</
ows:Value>
    <ows:Value>greenland_ice_thickness</ows:Value>
    <ows:Value>greenland_elevation</ows:Value>
    ...
  </ows:Parameter>

</ows:Operation>
```

WCS GetCapabilities - GetCoverage

```
<ows:Operation name="GetCoverage">
  <ows:Parameter name="Identifier">
    <ows:Value>sea_ice_concentration_01</ows:Value>
    ...
    <ows:Value>greenland_bedrock_elevation</
ows:Value>
  </ows:Parameter>
  <ows:Parameter name="InterpolationType">
    <ows:Value>NEAREST_NEIGHBOUR</ows:Value>
    <ows:Value>BILINEAR</ows:Value>
  </ows:Parameter>
  ...
</ows:Operation>
```

WCS GetCapabilities - GetCoverage

```
<ows:Operation name="GetCoverage">
...
  <ows:Parameter name="format">
    <ows:Value>image/png</ows:Value>
    <ows:Value>image/tiff</ows:Value>
    ...
  </ows:Parameter>
  <ows:Parameter name="store">
    <ows:Value>>false</ows:Value>
  </ows:Parameter>
  <ows:Parameter name="GridBaseCRS">
    <ows:Value>urn:ogc:def:crs:epsg::4326</ows:Value>
  </ows:Parameter>
  ...
</ows:Operation>
```

WCS GetCapabilities - more info about coverages?

<Contents>

<CoverageSummary>

<ows:Title>Stroeve, J. and W. Meier. 1999, updated 2008. Sea Ice Trends and Climatologies from SMMR and SSM/I. Boulder, Colorado USA: National Snow and Ice Data Center. ...</ows:Title>

<ows:Abstract> Sea ice concentrations from Nimbus-7 SMMR and DMSP SSM/I passive microwave data. Monthly climatologies of sea ice concentration represent mean ice concentration percentages for each month over the entire time period 1979-2007, which is generated from passive microwave brightness temperature data derived from Nimbus-7 ...</ows:Abstract>

<Identifier>sea_ice_concentration_01</Identifier>

WCS GetCapabilities - more info about coverages?

```
<Contents>
  <CoverageSummary>
    ...
    <ows:BoundingBox
crs="urn:ogc:def:crs:OGC::imageCRS" dimensions="2">
      <ows:LowerCorner>0 0</ows:LowerCorner>
      <ows:UpperCorner>316 332</ows:UpperCorner>
    </ows:BoundingBox>
    ...
    <ows:WGS84BoundingBox dimensions="2">
      <ows:LowerCorner>-179.999998745864
34.9037152643753</ows:LowerCorner>
      <ows:UpperCorner>178.959571606408
53.7717181062498</ows:UpperCorner>
    </ows:WGS84BoundingBox>
    <SupportedFormat>image/tiff</SupportedFormat>
    <SupportedCRS>urn:ogc:def:crs:EPSG::32661</
SupportedCRS>
    ...
  </CoverageSummary>
```

WCS DescribeCoverage

Thickness and bed data set for the Greenland ice sheet

http://nsidc.org/cgi-bin/atlas_north?

service=WCS&

version=1.1.1&

request=DescribeCoverage&

identifier=greenland_elevation

WCS DescribeCoverage - Domain

```
<Domain>
  <SpatialDomain>
    ...
    <ows:BoundingBox crs="urn:ogc:def:crs:EPSG::32661"
dimensions="2">
      <ows:LowerCorner>-825267.555 -1151631.237</
ows:LowerCorner>
      <ows:UpperCorner>2173789.735 2041572.863</
ows:UpperCorner>
    ...
    <GridCRS>
      <GridBaseCRS>urn:ogc:def:crs:EPSG::32661</
GridBaseCRS>
      <GridType>urn:ogc:def:method:WCS:
1.1:2dSimpleGrid</GridType>
      <GridOrigin>-822767.555 2039072.863</GridOrigin>
      <GridOffsets>5000 -5000</GridOffsets>
      <GridCS>urn:ogc:def:cs:OGC:0.0:Grid2dSquareCS</
GridCS>
    </GridCRS>
  </SpatialDomain>
</Domain>
```

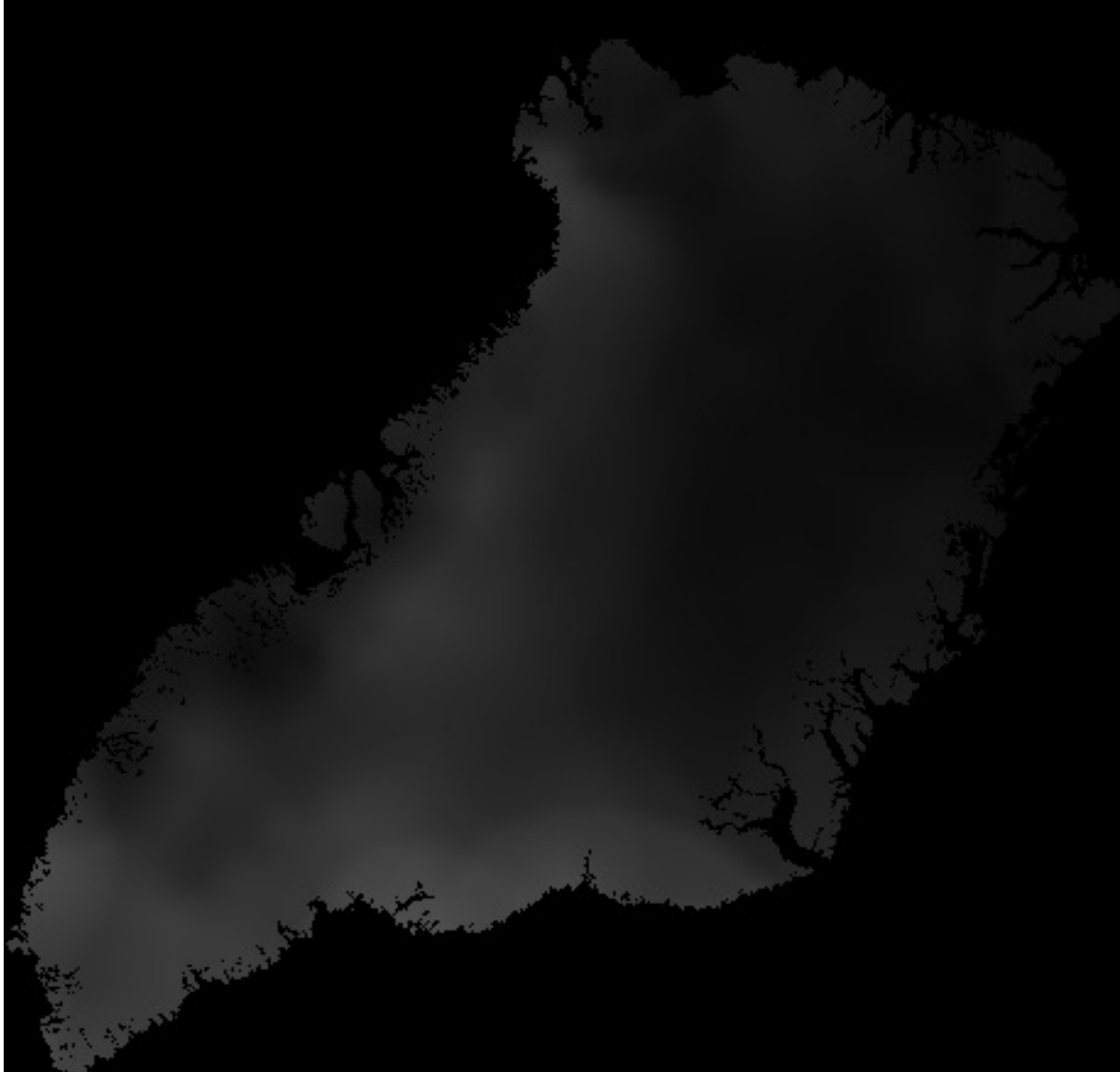
WCS DescribeCoverare - Range

```
<Range>
  <Field>
    <ows:Title>Greenland surface elevation (m)</
ows:Title>
    <Identifier>pixels</Identifier>
    <InterpolationMethods>
      <DefaultMethod>nearest neighbor</DefaultMethod>
      <OtherMethod>bilinear</OtherMethod>
    </InterpolationMethods>
    <Axis identifier="bands">
      <AvailableKeys>
        <Key>1</Key>
      </AvailableKeys>
    </Axis>
  </Field>
</Range>
```


WCS GetCoverage

```
http://nsidc.org/cgi-bin/atlas_north?  
service=WCS&  
version=1.1.1&  
request=GetCoverage&  
crs=EPSG:32661&  
format=GeoTIFFFloat32&  
resx=5000&  
resy =5000&  
bbox=-500000,-500000,1800000,1700000&  
identifier=greenland_elevation
```

WCS GetCoverage result

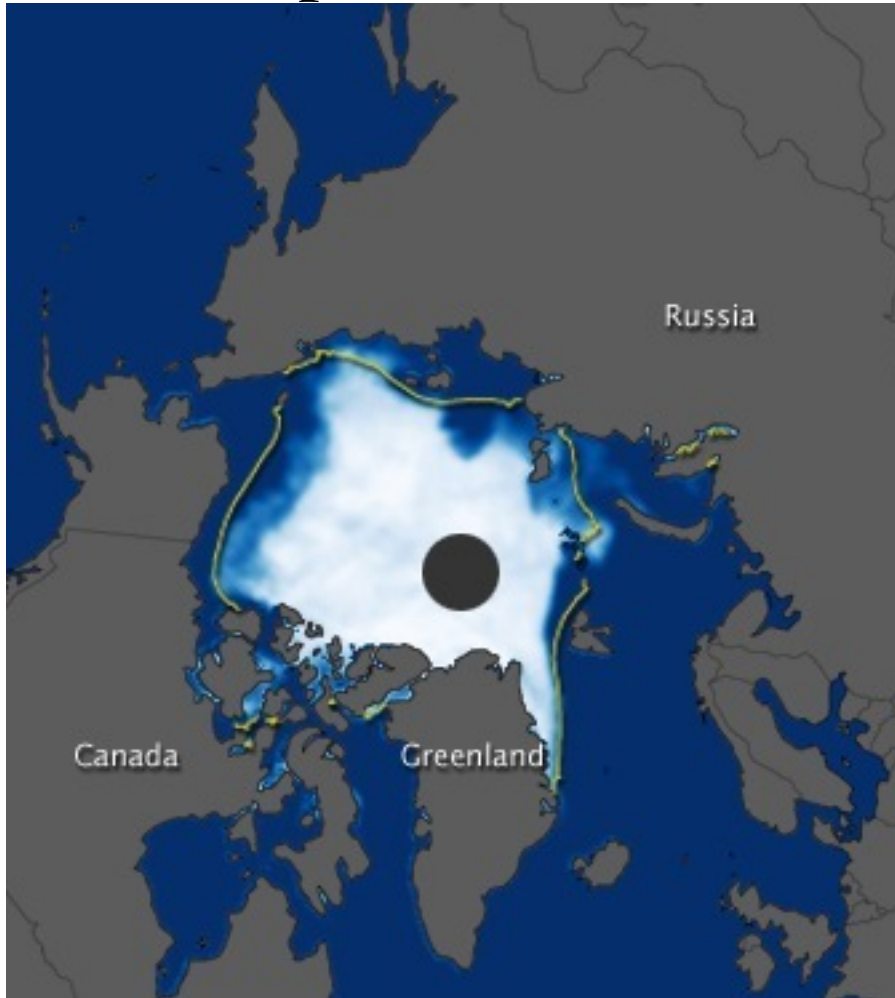


Sea Ice Cap in the Artic Ocean

September/March (minimum/maximum)	September Average Extent (millions of square kilometers)
1979-2000 mean	7.0
1999/2000	6.2
2000/2001	6.3
2001/2002	6.8
2002/2003	6.0
2003/2004	6.1
2004/2005	6.0
2005/2006	5.6
2006/2007	5.9
2007/2008	4.3
2008/2009	4.7
2009/2010	5.4
2010/2011	4.6

From: Nasa Earth Obsevatory

Sea Ice Cap in the Arctic Ocean



Get an Image (raster) via WCS from the sea ice concentration in the arctic at NSIDC Atlas

Supporting services

Web Map Context

The OpenGIS Web Map Context

Implementation Specification defines how a specific grouping of one or more maps from one or more WMS servers can be described in a portable, platform-independent format for storage in a repository or for transmission between clients. A Context Document contains sufficient information for Client software to reproduce the map, and ancillary metadata used to annotate or describe the maps and their provenance for the benefit of human viewers.

Symbology Encoding

The OpenGIS [**Symbology Encoding**](#).

Implementation Specification defines an XML language for styling information used to portray Feature and Coverage data.

Styled Layer Descriptor

The OpenGIS [**Styled Layer Descriptor Profile**](#) of the Web Map Service Implementation Specification explains how WMS can be extended to allow user-defined symbolization of feature and coverage data. This profile defines how the Symbology Encoding specification can be used with WMS.

Filter Encoding

The OpenGIS [Filter Encoding](#) Implementation Specification defines a common component that can be used by a number of OGC web services. Any service that can query objects from a web-accessible repository can make use of the Filter Encoding. For example, WFS may use Filter Encoding in a GetFeature operation

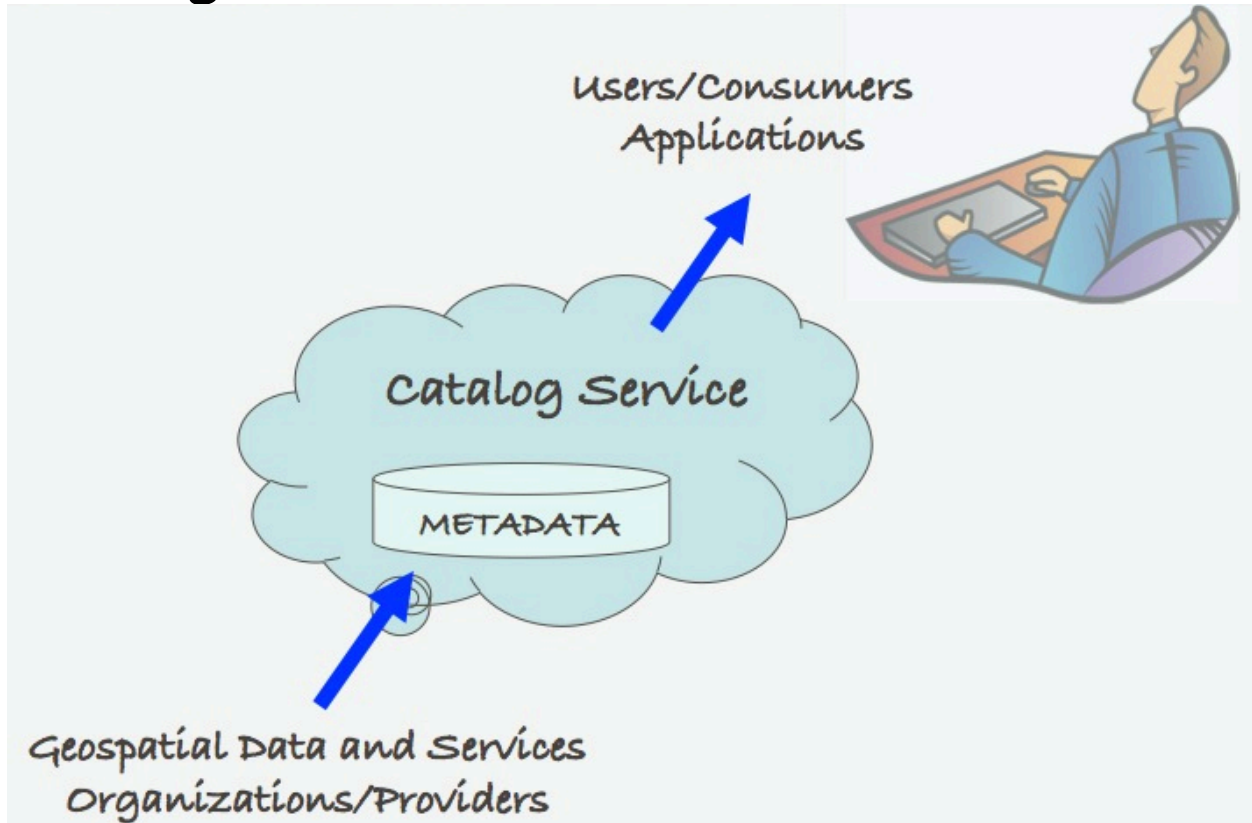
Catalogs

Metadata and Catalogs

Catalogs



Catalog Services



Catalog Terminology

Resource – anything on the Web

Metadata – data about data

Search – discovery & evaluation of resources

Catalog Terminology

Catalog – organized list of items

Registry – system for maintaining a register

Repository / Archive – for storage

Trader – connects providers with consumers

What is this ?



Usefull Metadata

Map Layer Info

Butterfly Occurrence Database

Title

Creator

Links to download

What this map layer shows:

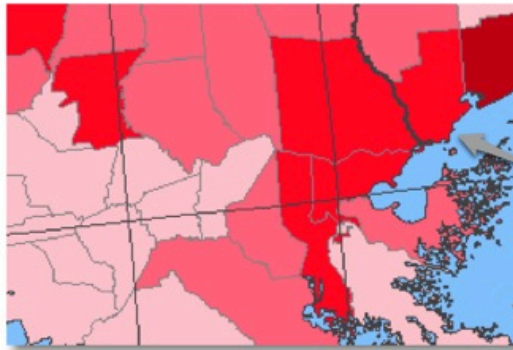
Where nearly 800 species of butterflies are found, by county.



Background Information

The Butterfly Occurrence Database is a collection of information about butterflies in the United States. It was compiled by the Northern Prairie Wildlife Research Center (NPWRC) of the U.S. Geological Survey, which studies the numbers and distribution of plants and animals to support the management and conservation of our Nation's biological resources. As part of this effort, the NPWRC collects information on butterfly distribution using U.S. museums, State university collections, publications, private collections, and consultation with experts. Butterflies are usually identified by looking at actual specimens.

Abstract



Sample Map

Preview

BIOLOGY

Map Maker Sample

Butterflies - Butterfly Distribution

Raw Data Download

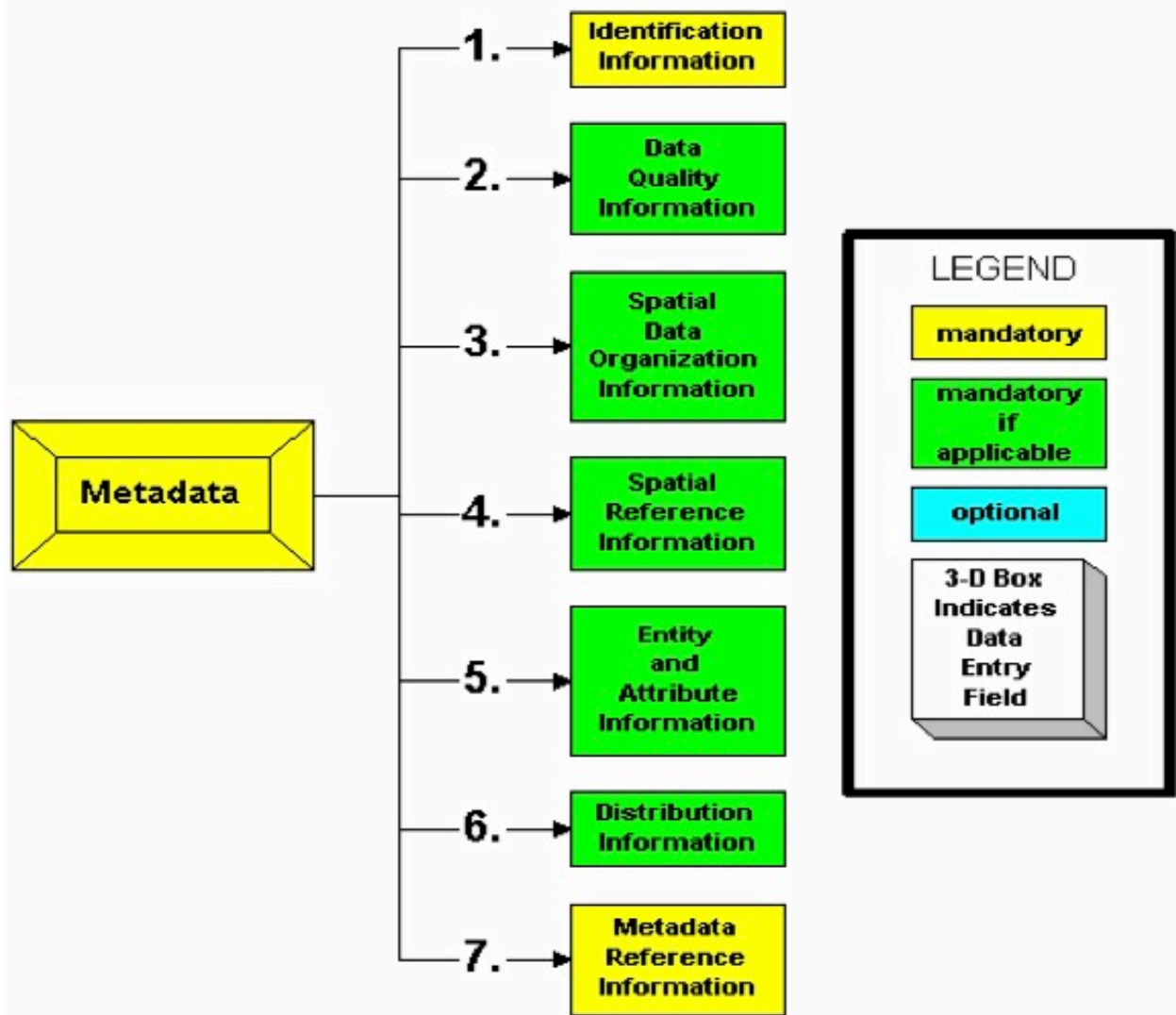
Butterfly Occurrence

Metadata Standards

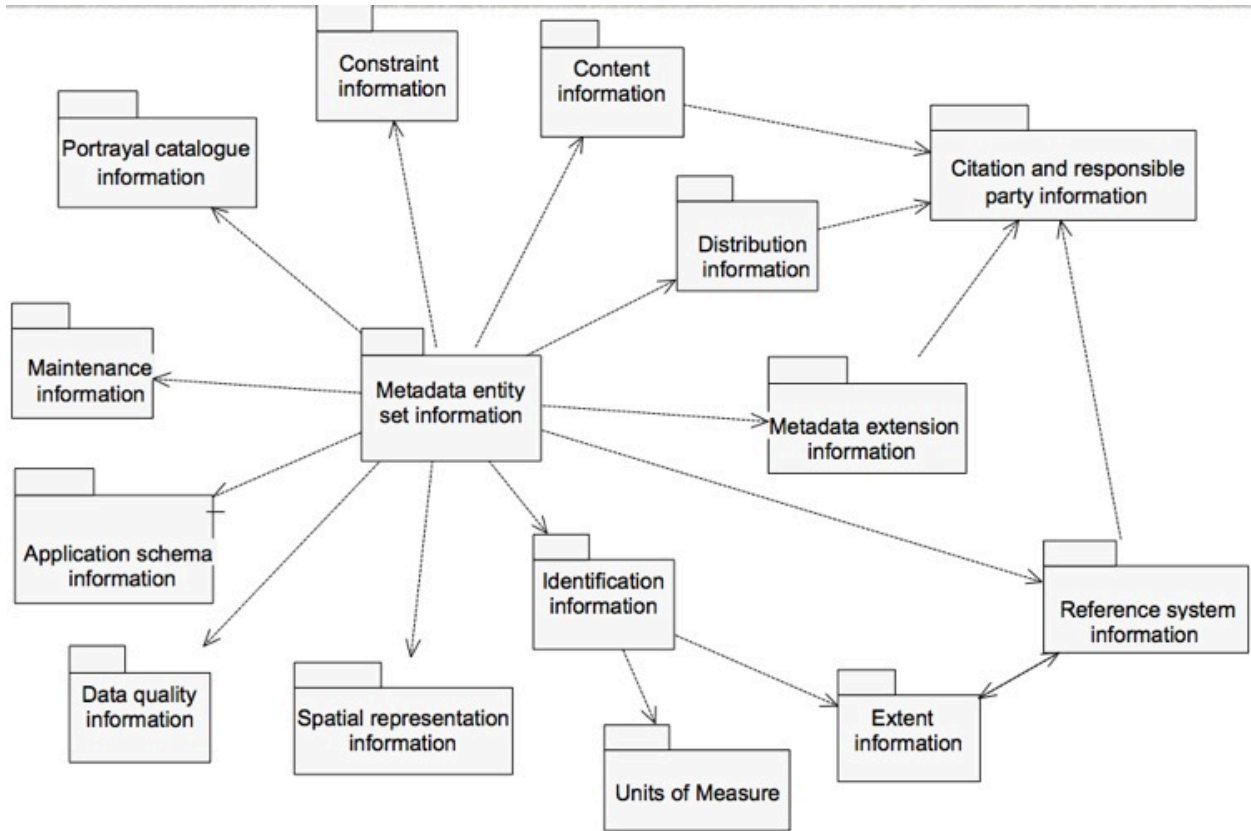
FGDC Content Standard for Digital Geospatial Metadata
(CSDGM)

ISO 19115 Geographic Information - Metadata

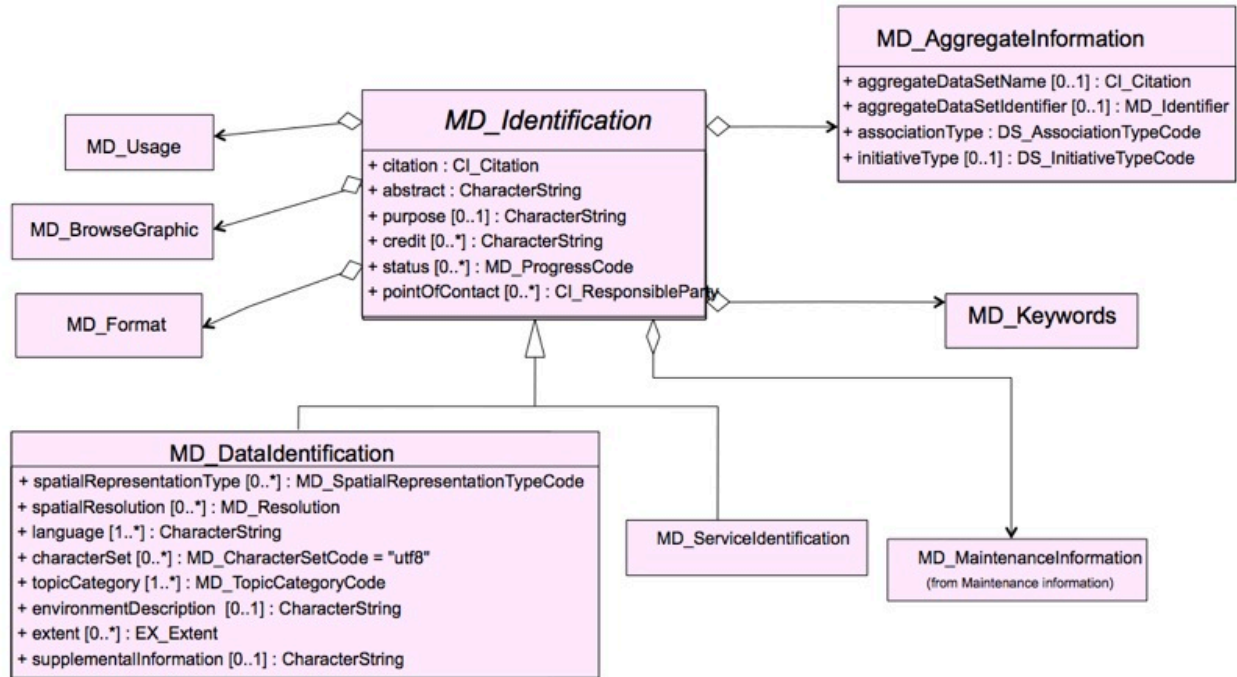
FGDC



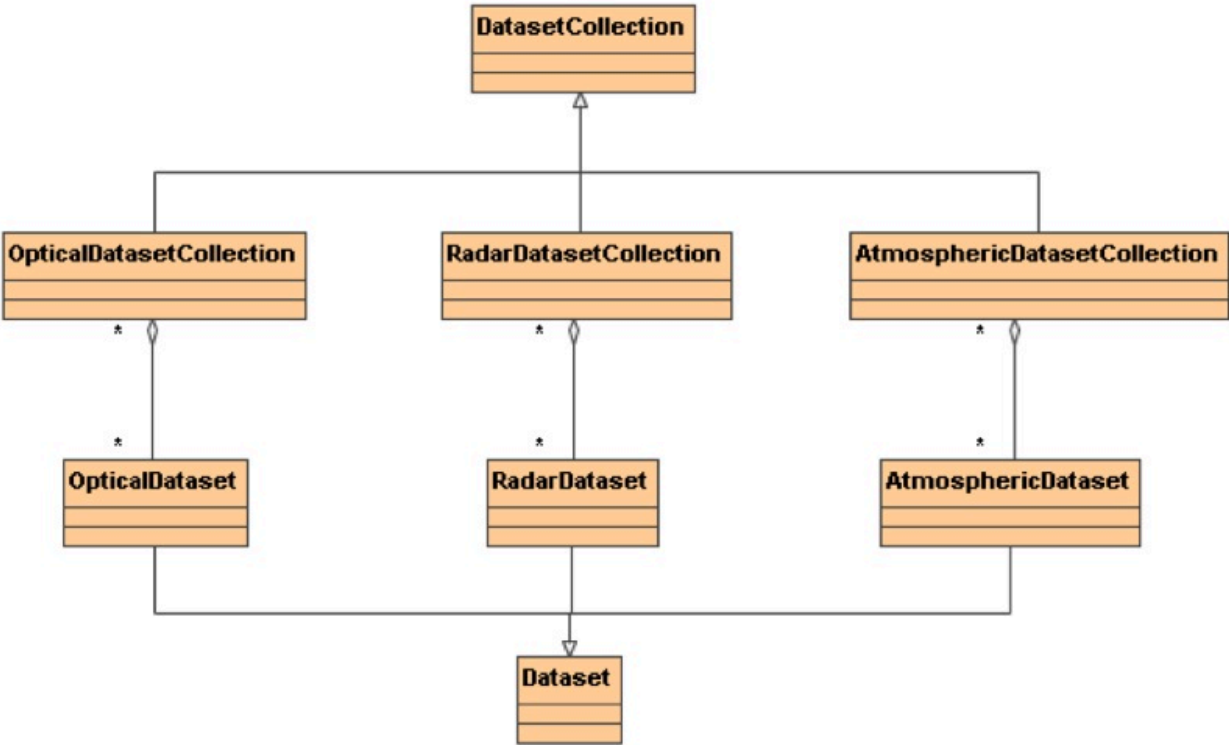
ISO 19115



ISO 19115

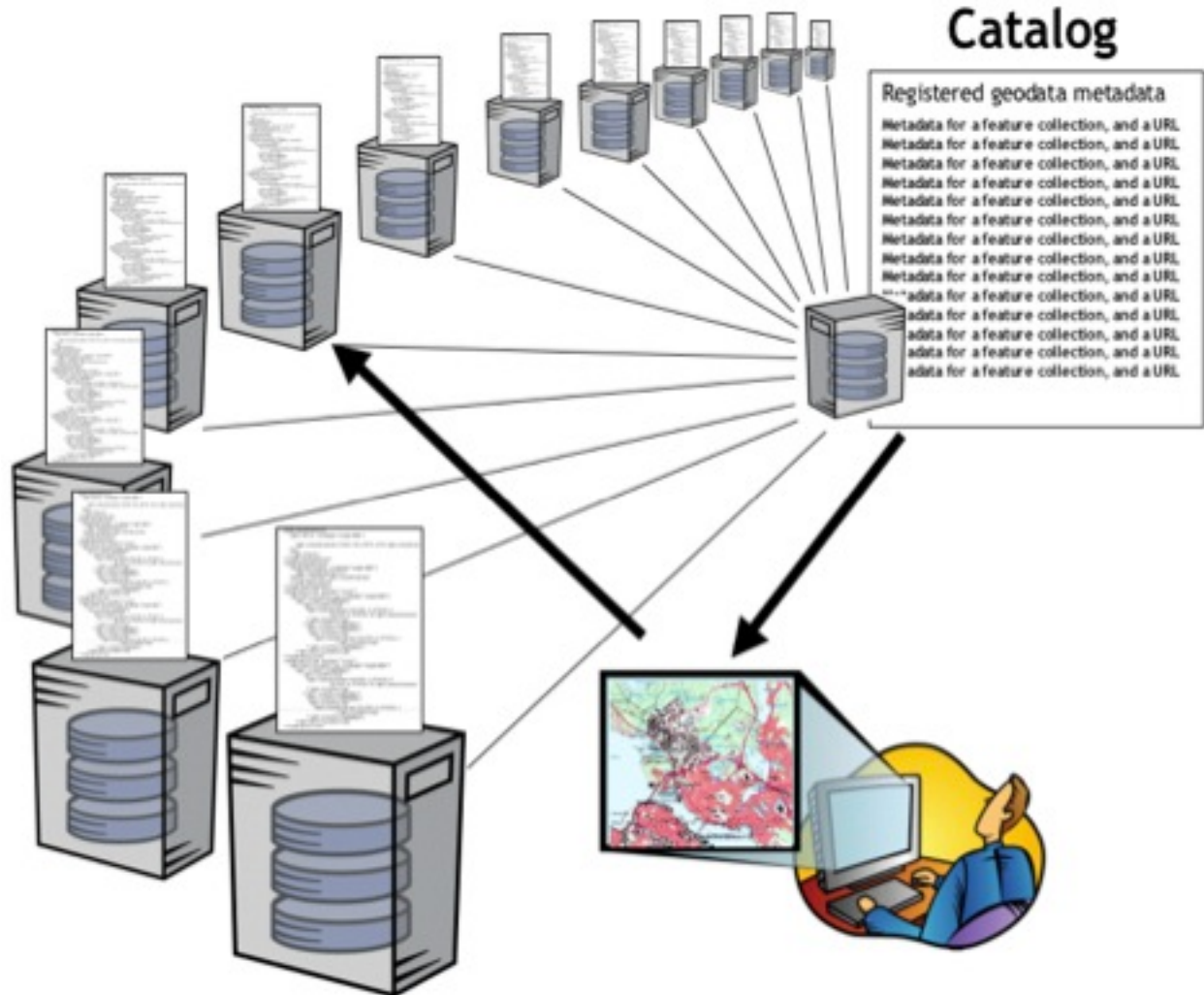


ISO 19115 Collections



CSW

Catalog Services



CSW

ISO 19119 Metadata Profile

Z39.50 Profile

OASIS ebRIM Profile

OpenSearch

GEOOS Registry (400 entries)




[Home](#)
[About](#)
[Registration Holdings](#)
[Search](#)
[Registration](#)
[API Interface](#)
[Standards Registry](#)

Component and Service Registry - Registration Holdings

These two charts were automatically generated on *Feb 3, 2012* at 2:00AM EDT. You might want to check out the public search interface to know the most current data holdings information.

Please note that only approved Components and Service Instances are listed here. You may login to the secure publication portal to search all Components and Service Instances including pending records. After login, you can also request for approval of pending Components or Service Instances records you registered.

Click to see all the Components

Click to see Data-CORE Information

Click to see all the Services

Component List

Click on the heading to sort the column.

List	Component Name	Agriculture	Biodiversity	Climate	Disasters	Ecosystems	Energy	Health	Water	Weather	Details
1.	20m digital elevation model of Italy										Details
2.	52?North SOS Client										Details
3.	52?North Sensor Observation Service										Details
4.	ACQWA										Details
5.	AEMET Current observations available										Details
6.	AEMET Meteorological Data Server										Details

CSW Operations

CSW GetCapabilities

[http://geossregistries.info:1090/GEOSSCSW202/
discovery?](http://geossregistries.info:1090/GEOSSCSW202/discovery?)

Request=GetCapabilities&

Service=CSW&

Version=2.0.2

CSW DescribeRecord

[http://geossregistries.info:1090/GEOSSCSW202/
discovery?](http://geossregistries.info:1090/GEOSSCSW202/discovery?)

Request=DescribeRecord&

Service=CSW&

Version=2.0.2&

NAMESPACE=xmlns(rim=urn:oasis:names:tc:ebxml-
regrep:xsd:rim:3.0)

CSW GetRecordById

[http://geossregistries.info:1090/GEOSSCSW202/
discovery?](http://geossregistries.info:1090/GEOSSCSW202/discovery?)

Service=CSW&

Request=GetRecordById&

Id=urn:uuid:a9ad5a4b-1589-4876-
a149-904fc5a9fef0:1.8

ebRIM

ebRIM Enhanced information model for catalogs

The screenshot displays the ebXML Registry Repository interface. The top navigation bar includes the 'freebXML' logo, the title 'ebXML Registry Repository', and links for 'Home' and 'Frequently Asked Questions'. Below the navigation bar, there are buttons for 'Login', 'Reset Locale', 'End Session', and a 'Versioning ON' checkbox. A 'Content Language' dropdown menu is set to 'English (United States)'. The main interface is divided into a left sidebar and a main content area.

Left Sidebar:

- Tasks:** Search, Explore
- Select predefined query:** Basic Query (dropdown)
- Basic query for selecting registry objects by name, description and classification**
- Federated Query:**
- Object Type:** RegistryObject (dropdown)
- Name:**
- Description:**
- Status:** StatusType (dropdown)
- Select Classification Node...**
- Value:** /urn:x-ogc:specification:csw-eb

Main Content Area:

Registry Objects

Buttons: Apply, Approve, Deprecate, UnDeprecate, Bookmark, Relate, Delete, Deletion Option: Delete

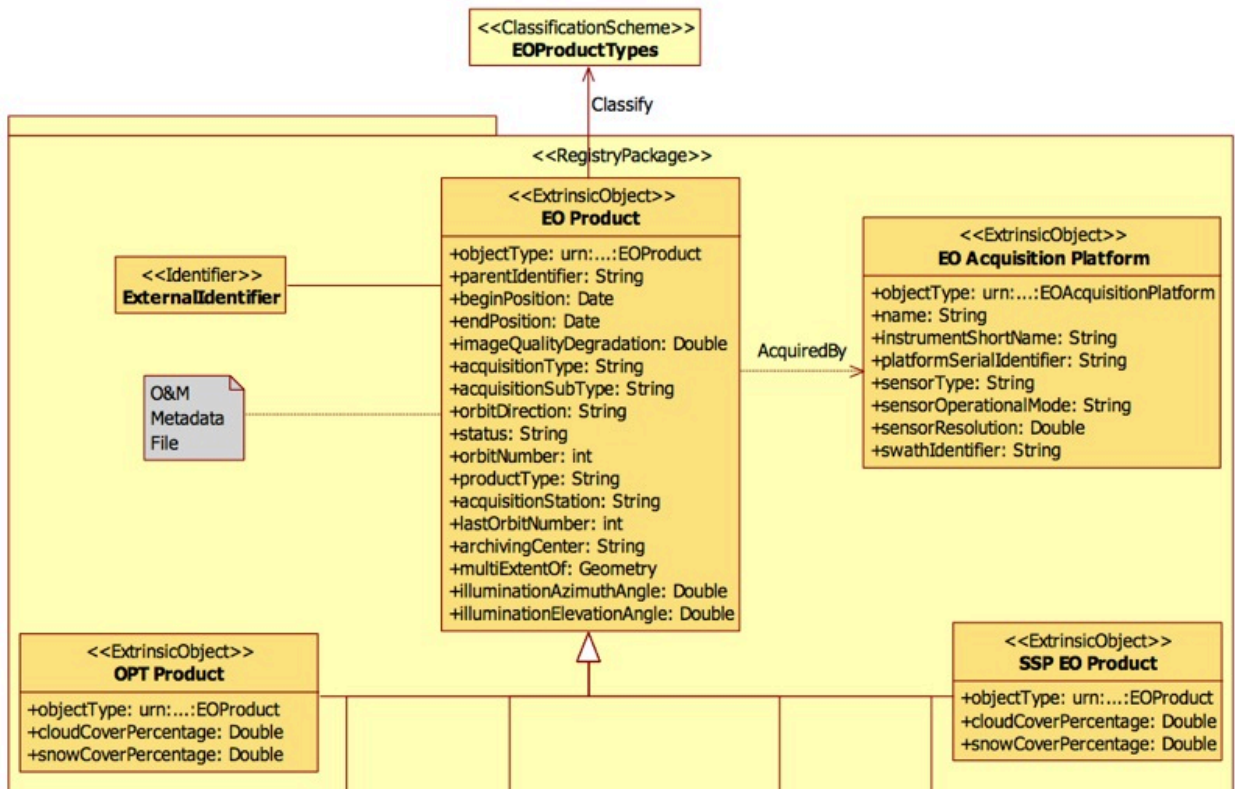
Buttons: Set or Change Status, Select Status (dropdown)

Results 1 - 2 of 2

Pick	Details	Object Type	Name	Description
<input type="checkbox"/>	Details	Service	ICEDSWCS	ICEDS (Integrated CEOS European Data Server) WCS
<input type="checkbox"/>	Details	Service	MapServer WCS	SRTM30Plus WCS Server

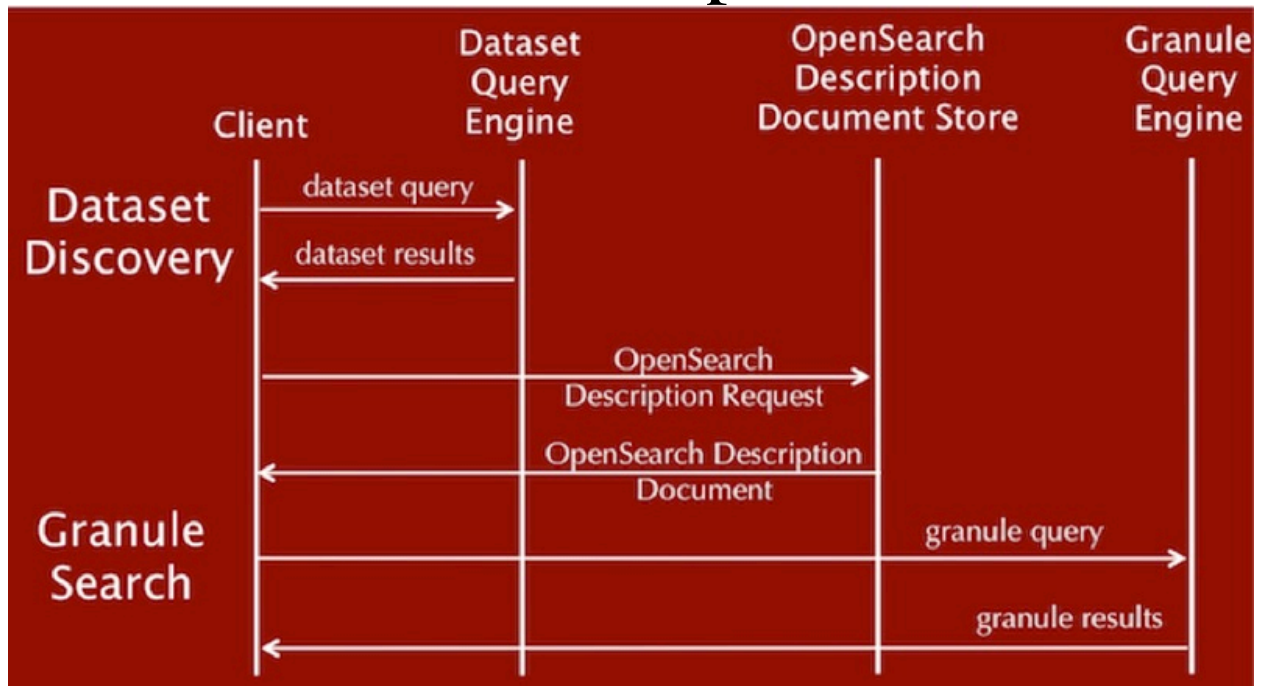
Navigation: Previous ◀ 1 Next ▶

ebRIM EO



OpenSearch

Federated Search with OpenSearch



OpenSearch Description Document

```
<?xml version="1.0" encoding="UTF-8"?>
<OpenSearchDescription
  xmlns="http://a9.com/-/spec/opensearch/1.1/">
  <ShortName>Mirador Dataset Search</ShortName>
  <Description>Use Mirador Dataset Search to obtain a
  list of Earth Science Data Sets</Description>
  <Tags>Mirador Dataset Search</Tags>
  <Contact>mirador-disc@listserv.gsfc.nasa.gov</
```

Contact>

```
  <Url type="application/atom+xml"
    template="http://mirador.gsfc.nasa.gov/cgi-bin/
mirador/collectionlist.pl?
  keyword={searchTerms}&
  page=1&
  count={count}&
  osLocation={geo:box}&
  startTime={time:start}&
  endTime={time:end}&
  format=atom"/>
</OpenSearchDescriptio
```

OpenSearch Geo

`http://example.com/?
q=pizza&bbox=-111.032,42.943,-119.856,43.039&format=rss`

`http://example.com/?
q=pizza&lat=43.25&lon=-123.45&radius=10000&format=rss`

`http://example.com/?q=pizza&l=boston&format=rss`

OpenSearch