Topics

- What is the Object Editor?
- Why is it needed?
- What’s new? A different approach…
- Use cases
- Demo of Object Editor
- Introduction to the GeoPlatform Profile for ISO-19115-3
What is the Object Editor?

A tool for “curating” Portfolios of Online Geospatial Resources…

- Create and register portfolio objects (representations of resources):
  - Dataset
  - Service
  - Layer
  - Map
  - Organization
  - Contact
  - Concept (e.g., Keyword, Theme)
  - Concept Scheme (e.g., Thesaurus)

- Curate portfolio objects into linked collections (a web) of resources of interest

- Manage online resources as unique, consistent, and unambiguous objects

- Update / correct / augment information about objects. Specifically, elements essential for automated search and online access:
  - Identification
  - Citations
  - Responsible parties
  - Keywords/ topics/ themes
  - Distribution
  - Formats
  - Distributors
  - Digital transfers
  - Online resources

- A work-in-progress… with a roadmap for incremental rollout of new capabilities this year

GEOPLATFORM.gov
Why? So users can find what they need!

- **A-16 National Geospatial Data Assets (NGDA)**
  - 177 datasets

- **Data.gov**
  - 122,791 geospatial datasets

- **Data.gov CSW**
  - [https://catalog.data.gov/csw-all?REQUEST=GetCapabilities&SERVICE=CSW](https://catalog.data.gov/csw-all?REQUEST=GetCapabilities&SERVICE=CSW)
  - 122,791 datasets and (and 32 services)

- **EPA Environmental Data Gateway (EDG)**
  - 3,034 items

- **NOAA GEO-IDE UAF ERDDAP**
  - 8,985 datasets

- **NOAA CSW**
  - [https://data.noaa.gov/csw?REQUEST=GetCapabilities&SERVICE=CSW](https://data.noaa.gov/csw?REQUEST=GetCapabilities&SERVICE=CSW)
  - 45,654 datasets (and 65 services)

- **ArcGIS Online**
  - 1,020,570 maps

- **GEOPLATFORM.gov**
Why? Connecting user-needs to data and services

Finding and remembering the good stuff, forgetting the bad stuff…

(1) Describe Datasets and Services for Machine-Consumption
ISO Metadata according to FGDC Guidelines
✓ Identification
✓ Distribution

(2) Ground to Semantic Concepts (from Taxonomies)
Taxonomies (Controlled Vocabularies)
✓ Well defined meaning of terms (concepts)
✓ Unambiguous
✓ Unique

(3) Link into Knowledge Graphs for Navigation and Reasoning
Unified Knowledge Graph
✓ 5 ★ Linked Data
✓ Machine-encoded facts
✓ Framework for reasoning and navigation

(4) Advanced Search and Analysis
Advanced Search
✓ Navigate
✓ Discover
✓ Discern
✓ Recommend

(5) Doing things with Maps, Layers, Services, and Datasets
“Quickly find the right resource for my need”
“Let me build and share my Open Map”
“Let me add to my community gallery”
“How are my assets performing?”

With improved...
• Reliability
• Precision
• Performance
• QoS
• Consistency

GEOPLATFORM.gov
What’s the Big Idea? Linked Open Data (LOD)

Metcalf’s Law… there’s more valuable information when we link things together.

- Data "on-the-Web" characterizes unlinked, hard to find, document-based data
- Data “in-the-Web” describes well-integrated, linked data providing value-added network effect benefits

**Good news:** Geodata from US is generally…
- Downloadable as files “on-the-Web”
- Freely available under an open license
  - Data can be stored locally
  - Data can be used anyway you wish
  - Data can be shared with anyone
  - Data can be modified as you wish

**Bad news:** still not good enough to find the right data at the right time…
- To automatically get data in-the-Web, we need good identification and distribution metadata

**Really good news!** Basic metadata for Datasets and Services opens up the world of Linked Data, Knowledge Graphs and Advanced Search

- GEOPLTATFORM.gov
Towards 5★ Open Data

Towards a world of **unambiguous, semantically-grounded linked data** that adds rich context and meaning to shared data…. The last rung in the interoperability ladder.

<table>
<thead>
<tr>
<th>Level of Openness</th>
<th>Description</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>★</td>
<td>Make your stuff available on the Web (whatever format) under an open license</td>
<td><strong>OK.</strong> It's great to have the data accessible on the Web under an open license (such as <a href="https://www.pddl.org/">PDDL</a> or <a href="https://www.opendatacommons.org/">ODC</a>, however, the data is locked-up in a document. Other than writing a custom scraper, it's hard to get the data out of the document.</td>
</tr>
<tr>
<td>★★</td>
<td>Make it available as structured data (e.g., Excel instead of image scan of a table)</td>
<td><strong>Splendid!</strong> The data is accessible on the Web in a structured way (that is, machine-readable), however, the data is still locked-up in a document. To get the data out of the document you depend on proprietary software.</td>
</tr>
<tr>
<td>★★★</td>
<td><em>Use non-proprietary formats (e.g., CSV instead of Excel)</em></td>
<td><strong>Excellent!</strong> The data is not only available via the Web but now everyone can use the data easily. On the other hand, it's still data on the Web and not <em>data in the Web</em>.</td>
</tr>
<tr>
<td>★★★★</td>
<td><em>Use URIs to denote things, so that people can point at your stuff</em></td>
<td><strong>Wonderful!</strong> Now it's data in the Web. The (most important) data items have a URI and can be shared on the Web. A native way to represent the data is using RDF, however other formats such as Atom can be converted/mapped, if required.</td>
</tr>
<tr>
<td>★★★★★</td>
<td><em>Link your data to other data to provide context</em></td>
<td><strong>Brilliant!</strong> Now it's data, in the Web <strong>linked to</strong> other data. Both the consumer and the publisher benefit from the <strong>network effect</strong>.</td>
</tr>
</tbody>
</table>

*Tim Berners-Lee*, the inventor of the Web and Linked Data initiator, suggested this **5 star deployment scheme** for Open Data
GeoPlatform.gov: Objects and Internet Things

Creating Curated Portfolios of Objects…

- Portfolio Objects
- Things (Online Resources)
  - Dataset
  - Service
  - Layer
  - Map

Other Things
- Web Sites
- Documents
- Specifications
- Articles
- Organizations
- Taxonomies/Thesauri
- Places

Metadata
- MD

GEOPLATFORM.gov
The Unified Knowledge Graph

A Network of Maps, Layers, Services, Datasets, People, Organizations....

The Semantic Web

GEOPLATFORM.gov
Primarily concerned with properly supporting the semantic web and enabling autonomous (machine-machine) access to services

- mapping relationships between Datasets, Services, Layers, and Maps by...
- ensuring they have clear and concise identification and location information
- Support Linked Open Data standards

Uniform Resource Identifiers (URIs) are used to ensure each resource has a unique and persistent identifier (as required for LOD)

Open Layer and Open Map identification classes are added at the same level as Dataset and Service identification so they can be linked in metadata for exchange

Formal semantics are added via Knowledge Graphs that wrap each resource

- Make use of controlled vocabularies so that all key concepts are unambiguous

Draft spec and schema online here: https://www.geoplatform.gov/gp-profile
ISO-19115 GeoPlatform Profile (Specifics)

Concerned with properly supporting the semantic web and autonomous (machine-machine) access to services...

- Added **identifier** elements to the MD_Identification class and the CI_Party class, **ontologyURI** element to MD_FeatureTypeInfo, and a **uri** element to the CI_Citation class. *(unambiguously ID things)*
- The element **serviceDocumentation** of type CI_OnlineResource has been added to the class SV_Serviceldentification *(a non-standard, self-describing service… e.g., a swagger document)*
- The elements **format**, **representationTechnique**, and **mimeType** have been added to the CI_OnlineResource data type to allow better description of online resources *(more machine-consumable)*
- SV_Serviceldentification **operatesOn** domain is modified to allow any specified class of **MD_Idenfication** *(Services operate on Maps and Layers too, not just Datasets)*
- Introduces a new element of the MD_Keywords class, **concept**, which is defined by a new class, MD_Concept with the following elements and attributes: **conceptIdentifier**, **preferredLabel**, **alternateLabel**, and **description** *(more general-purpose than tags/keywords/themes/places/etc)*
- When **concept** is used, **keyword** should be used to refer to the preferredLabel of a SKOS Concept, MD_Keywords: **type** should refer to the concept type, and MD_KeywordClass: **ontology** should be used for concept scheme *(so we can link keywords to grounded SKOS concepts and ontologies)*
- To enable better semantic search, the attribute **type** should use the appropriate code in the KeywordTypeCodes code list and thus, five new KeywordTypeCodes have been added: **audience**, **subject**, **community**, **function**, and **domain** *(more ways to link to grounded concepts for “tradecraft”)*
Introducing Object Editor

*Is used to support these functions…*

- Import ISO-19115 for Datasets and Services to create representations in GeoPlatform
- Fix and augment metadata about Dataset and Service objects
- Automatically harvest and link Service and Layer objects
- Export ISO-19115 for Datasets and Services (and, soon, Layers and Maps)

*It’s not a…*

- A metadata editor
- A metadata validator
- A metadata viewer
- A tool for publishing metadata to external catalogs and portals (data.gov, CSW, CKAN, etc)
Curating Objects with Object Editor

Managing the Portfolio of Geospatial Resources

1. Register (publish) an Dataset object
   - Upload ISO 19115 metadata document
   - Search and import from data.gov
   - Bulk harvest from data.gov CSW
   - Create from scratch if needed

2. Update a Dataset object
   - Review identification (title, description, keywords, themes, extent) and distribution elements. Everything good?
   - Augment with additional information
   - Link to Services and other resources
   - Export ISO 19115 document

3. Register and update an Open Service object
   - Create from a known service endpoint (URL)
   - Bulk harvest from online CSW catalogs
   - Augment with additional identification information

4. Register and update an Open Layer object
   - Create from scratch
   - Harvest from a known service endpoint (URL)
   - Augment with identification information and links to Dataset and other resources
The Metadata-Object Lifecycle

Start

Agency submits meta record for harvest by data.gov

ISO?

No

CSDGM

Lossy transform to ISO-19115 (19139)

ISO-19115 (19139)

ISO Metadata stored in Data.gov

Yes

Search & Download

Down- load

ISO-19115 (19139)

Exists?

Yes

Automated Reconciliation / Merge

No

Transform to Profile / RIM

Search, access, exploit

Stop

Agency retains/ reconciles updates

ISO 19115-3 (GP Profile)

Export

Curate objects

Registry Objects stored in GeoPlatform.gov

Every RIM object has a globally unique and persistent identifier (URI)
Registering a Dataset Object

1. **Start**

   - **Have ISO Metadata?**
     - Yes: **Upload ISO Metadata**
     - No: **Create from Scratch?**

   - **Create from Scratch?**
     - Yes: **Enter Object Properties**
     - No: **Review properties**

   - **Review properties**

   - **Fix and augment properties**

   - **Services listed in DistInfo?**
     - Yes: **Promote URL to linked Service object**
     - No: **Save**

**Object Properties**
- Title
- Description
- URI
- Status
- Keywords
- Themes
- Contacts (Publisher/Creator/Contributor)
- Geographic Extent
- Services
- Related Resources
- Distributions
- Identifiers
- Access Rights

**Data.gov**

**GEOPLATFROM.gov**
Registering a Service Object

Start

Have ISO Metadata?
- Yes: Upload ISO Metadata
- No:
  - Yes: Search External Catalog
  - No: Have Service URL?
    - Yes: Harvest Service Capabilities
    - No: Review properties

Fix and augment properties

Test Online Status

Harvest Open Layer objects

Save

Title
Description
URI
Status
URL
Application Profile
Geographic Extent
Keywords
Themes
Contacts (Publisher/Contact)
Datasets
Layers
Related Resources
Identifiers
Access Rights
Registering an Open Layer Object

Start

- Have a Service Object?
  - Yes: Enter Layer properties from scratch
  - No: Harvest Layers from Service

Harvest Layers from Service

Review Open Layer properties

Fix and augment properties

Save

<table>
<thead>
<tr>
<th>Title</th>
<th>Description</th>
<th>Status</th>
<th>URI</th>
<th>Name / Id</th>
<th>Type</th>
<th>Geographic Extent</th>
<th>Scale (min/max)</th>
<th>Keywords</th>
<th>Themes</th>
<th>Contacts (Publisher/Contact)</th>
<th>Services</th>
<th>Parent Layer</th>
<th>Sub-Layers</th>
<th>Datasets</th>
<th>Related Resources</th>
<th>Legend</th>
<th>Identifiers</th>
<th>Access Rights</th>
</tr>
</thead>
</table>
Object Editor Hands-on

https://uat-oe.geoplatform.us
User: demouser
Pwd: DemoUser.01
Use ISO 19115 and MD_DigitalTransferOptions in MD_Distribution to link Service with Dataset

```xml
<gmd:transferOptions>
  <gmd:MD_DigitalTransferOptions>
    <gmd:onLine>
      <gmd:CI_OnlineResource>
        <gmd:linkage>
          <gmd:URL>https://tigerweb.geo.census.gov/arcgis/services/TIGERweb/tigerWMS_Current/MapServer/WmsServer</gmd:URL>
        </gmd:linkage>
        <gmd:applicationProfile>
          <gco:CharacterString>https://opengis.net/spec/wms</gco:CharacterString>
        </gmd:applicationProfile>
        <gmd:name>
          <gco:CharacterString>TIGERweb/tigerWMS_Current (MapServer)</gco:CharacterString>
        </gmd:name>
        <gmd:description>
          <gco:CharacterString>This web mapping service contains the layer for Unified School Districts. Since this layer displays at scales of 1:4,622,324 or greater, adjusting the BBox coordinates in the URL is necessary</gco:CharacterString>
        </gmd:description>
        <gmd:function>
        </gmd:function>
      </gmd:CI_OnlineResource>
    </gmd:onLine>
  </gmd:MD_DigitalTransferOptions>
</gmd:transferOptions>
```

GEOPLATFOR%M.gov
Questions?
Thank You!
For more information, click here!