Energy Industry Profile and ISO 19115-3 development

83rd OGC Technical Committee
Redlands, CA USA
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Topics

- Energistics and Project participants

- EIP v1.0 Profile of 19115-1

- Prototype Project
  - Custom development for Geoportal to support EIP v1.0
  - Project Findings

- Update on ISO 19115-1 implementation (i.e. ISO19115-3) development
Energistics is a global, not-for-profit, membership organization that serves as the facilitator, custodian and advocate for the development and adoption of technical open data exchange standards in the upstream oil and gas industry.
Who is Energistics?

- An open standards industry consortium
- Serving the upstream industry since 1990
- Over 112 active corporate members…
  - Integrated, independent & national energy companies
  - Oilfield service and professional service companies
  - Software, hardware and integration vendors
  - Regulatory agencies and standards bodies
  - Universities, research institutes and media partners
Project Vision

Overarching Objectives

• Implement an Energistics-managed, EIP-compliant Catalog & Search System

• Establish a Network of 3-4 Systems Demonstrating Discovery of Distributed Resources

Contributors

– Energistics
– USGIN
– NOAA
– USGS
– Esri
– U. of Colorado/CIRES
EIP V1.0 SPECIFICATION
Anticipating need for automated processing of large numbers of metadata records, and to simplify development, implementation, and maintenance of supporting software –

**EIP v1.0**

- identifies **Three Classes of Information Resources**, and decomposes them into **Five Groups of Metadata Elements**
- maps **different combinations of Metadata Element Groups** to MD_Scope codelist values, and thus the metadata config
- e.g., “dataset” value identifies a Geolocated Digital Product

<table>
<thead>
<tr>
<th>Metadata Element Group</th>
<th>Digital Product</th>
<th>Physical Product</th>
<th>Digital Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Element Group</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>Digital Product-specific Group</td>
<td>Required</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Physical Product-specific Group</td>
<td>NA</td>
<td>Required</td>
<td>NA</td>
</tr>
<tr>
<td>Digital Service-specific Group</td>
<td>NA</td>
<td>NA</td>
<td>Required</td>
</tr>
<tr>
<td>Geolocated Resource-specific</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Key Metadata Packages

- Constraint
- Content
- Distribution
- Citation & Responsible Party
- Maintenance
- Lineage
- Metadata Entity
- Reference System
- Identification
- Extent
- Units of Measure
- Spatial Representation

Key packages are highlighted

Lines between packages are 'uses' dependencies
EIP Profile

• Profile of ISO 19115-3
  – Geographic Information Metadata Part I: Fundamentals

• May incorporate ISO 19115-4 in the future
  – Geographic Information Metadata Part 2: Instrumentation

[Diagram showing relationships between ISO standards and EIP]
Geoportal Custom Development

• Identify, Validate, and Create EIP v1.0 Metadata
  – Support the validation (schema and schematron) of metadata against the EIP v1.0 profile
    • Schema = working draft version of ISO 19115-3
    • Schematron provided by CIRES
    • Display of validation issues for invalid records
  – Form to create EIP v1.0 metadata
  – Human readable view of EIP metadata through xslt transformation

• Transform ISO 19115:2003 and FGDC Metadata to EIP
  – Transform upon harvesting
  – Transformation xslt’s provided by NOAA/CIRES
Transformations

ISO 19115:2003

ISO 19115-2

ISO 19115-3

ISO 19115-4*

FGDC

EIP

Can harvest, validate, and create through editor

Can harvest, and validate, but not create through editor

* Future ISO Technical Specification
“Save as Draft”: save and open it later, no validation will be applied.

“Save”: validation will be applied; when valid, will be saved to catalog as “Posted” status.
Dropdown lists – ISO 19115-3

- Hover over item in list to display description
EIP-Specific Search Options (basic)

Search (Advanced Options)

Resource Type
- Dataset
- Dataset (Non-geographic)
- Document
- Model
- ...
- Service

Spatial Search
- Anywhere
- Intersecting
- Fully within

Resource Status
- Planned
- Under Development
- Final
- Retired
- ...
- Historical Archive

Resource Publisher
EIP-Specific Search Options (advanced)

Maximum Spatial Resolution
- Sample Distance
- Units
- Scale 1:

Spatial Representation
- Grid
- Raster
- Vector

Access / Usage Constraints
- Copyright
- Licence
- Restricted
- Unrestricted
- ...

Resource Citation Date
- Start date: (yyyy-mm-dd)
- End date: (yyyy-mm-dd)

Spatial Search
- Anywhere
- Intersecting
- Fully within
Outcomes

• Phase I Prototype is live at http://energistics.geoportal.org/eip

• Group to evaluate if EIP specification is too strict
  – Most harvested records did not pass EIP validation

• Valuable to integrate EIP metadata completeness measures as part of next phase
ISO 19115-3 UPDATES
• Implementation: Modularization
• Testing with EIP prototype
• Current status
Implementation

• Packaging
• Requirements classes in ISO19115-1 are implicit in the packages defined in the conceptual model
• ISO19115-3 follows this packaging scheme to define conformance classes, BUT
  – Base metadata conformance class incorporates multiple packages
• Circular dependencies removed by use of abstract classes
19115-3 Conformance classes (draft!)

• **Metadata Base**: minimal metadata record
• **Metadata for Data and Services**: includes all 19115-1 metadata elements
• **Metadata Application**: metadata for aggregated datasets
• **Data Transfer**: Metadata-based transfer of geospatial information (from ISO 19139)
Conformance Classes: modular content

- Application Schema
- Catalogues (from ISO19139)
- Constraint
- Distribution
- Lineage
- Maintenance Information
- Metadata Extension
- Portrayal Catalogue
- Reference System
- Resource Content
- Service Metadata
- Spatial Representation
Decoupling Namespaces

- Optional property implemented in different ISO19115-1 packages
ISO19115-3 implementation

- Base conformance class

Lineage not available—there is no concrete class that implements the content

19115-1 package implemented as 19115-3 application schema

XML implementation

«Application Schema» Metadata Base

«XMLnamespace» mmd.xsd

«Application Schema» Metadata Common Classes

«XMLnamespace» mcc.xsd

«Abstract» _LineageInformation

MD_Metadata

+resourceLineage 0..*

«import»

«realize»

«realize»

19115-3 app schema defines abstract classes

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ISO19115-3 implementation

- Metadata for Lineage Conformance Class
Compare old and new XML

ISO 19115(2006)/ISO19139

<?xml version="1.0" encoding="UTF-8"?>
<md:MD_Metadata xmlns:md="http://www.isotc211.org/2005/gmx"
    xmlns:xlink="http://www.w3.org/1999/xlink"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.isotc211.org/2005/gmd http://schemas.opengis.net/gmx/2.0"
    xmlns:gmd="http://ogc:def:metadata:1.0.0">
  <gmd:fileIdentifier>
    <gco:CharacterString>14e15e1a59b766b334f0295e660c10e5f</gco:CharacterString>
  </gmd:fileIdentifier>
  <gmd:language>
    <gco:CharacterString>eng</gco:CharacterString>
  </gmd:language>
  <gmd:characterSet>
    <gmd:MD_CharacterSetCode>
      <codeList>
codelistValue=utf8"UTF-8"</codeListValue>
    </gmd:MD_CharacterSetCode>
  </gmd:characterSet>
  <gmd:hierarchyLevel>
    <gmd:MD_ScopeCode>
      <codeList>
codelistValue='Dataset'</codeListValue>
      </gmd:MD_ScopeCode>
    </gmd:hierarchyLevel>
  <gmd:characterSet>
    <gmd:characterSetCode>
      <gco:CharacterString>ISO 19115-1/ISO19115-3(draft 2012-10-13)</gco:CharacterString>
    </gmd:characterSetCode>
  </gmd:hierarchyLevel>
  <gmd:MD_Metadata>
    <gco:CharacterString>http://www.opengis.net/gml/3.2</gco:CharacterString>
  </gmd:MD_Metadata>
  </gmd:MD_Metadata>
  <gmd:MD_Metadata>
    <gco:CharacterString>http://www.w3.org/2001/XMLSchema-instance</gco:CharacterString>
  </gmd:MD_Metadata>
  </gmd:MD_Metadata>
</gmd:MD_Metadata>

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Testing

• Draft schema implemented and deployed using ESRI GeoPortal.
• XSLT for transformation from ISO19115(2006)/ISO19139 to ISO19115-1/ISO19115-3
• XSLT for transformation from FGDC CSDGM to ISO19115-1/ISO19115-3
• Schematron for validation against Energistics metadata profile
Issues

• Dependencies on ISO19157 (Data Quality), which is not yet implemented in XML

• Uses ISO19139 implementation for spatial (ISO19107) objects, implemented by GML3.1, which imports metadata from ISO19115(2006)/ISO19139

• Need new implementation of ISO19115-2 (imagery) that uses ISO19115-2…
Current Status

• Committee draft for 19115-3 implementation due this Spring
• ISO Work items created for implementation of ISO19157 and ISO19115-2.
• Update EIP profile and associated XSLT, schematron when 19115-3 is FDIS