Leveraging Metadata Standards in ArcGIS for Interoperability

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Leveraging Metadata Standards in ArcGIS for Interoperability

- Why metadata and metadata standards?
- Overview of metadata standards
- ArcGIS for Desktop supports metadata standards
- Notes for specific styles
- Customizing the metadata editor
- What’s next for metadata standards?
Why is geospatial metadata important?

- Geospatial data: representation of the real world
- Communicate the assumptions, limitations, approximations, simplifications
  - Enables understanding
- Support decisions, discovery, and reuse
- Identify a resource’s worth
- Archive information
Why follow standards?

Published  Accessible  Discoverable  Associations

Good  Better  Best
Why follow metadata standards?

- Content checklist for authors
- Common understanding of geospatial data
  - Between countries
  - Between communities
- Publish to metadata catalogs
- Consistent terminology for global search
Different types of metadata standards

- Content standards
  - What to write
  - Optionality

Example metadata:

Title: Different types of vegetation that can be found in the study area
Different types of metadata standards

- Implementation specifications
  - Format
  - Validity

```xml
<identificationInfo>
  <MD_DataIdentification>
    <citation>
      <CI_Citation>
        <title>
          <gco:CharacterString>Types of vegetation within the park</gco:CharacterString>
        </title>
      </CI_Citation>
    </citation>
  </MD_DataIdentification>
</identificationInfo>
```
Overview of Metadata Standards

• Updating ISO metadata standards
  - Official corrections or amendments
  - Create a new standard
  - Create a profile to modify or extend for a community
  - Revise existing standards

• Review existing standards every 5 years
Overview of Metadata Standards

- **Content Standard for Digital Geospatial Metadata (CSDGM)**
- mp, XML DTD, XML Schema
Overview of Metadata Standards

• ISO 19115:2003 Geographic information – Metadata
  - Incorporates data quality standard content
  - References data type standards
  - ISO 19115:2006 Technical Corrigendum 1

• ISO 19139:2007 Geographic Information -- Metadata -- XML Schema implementation
  - References GML for time and geometry
Overview of Metadata Standards

ISO 19115:2003/Cor.1 2006
ISO 19136:2007
GML time & geometry

ISO 19139:2007
Overview of Metadata Standards

- ISO 19119:2005 Geographic Information -- Services
  - ISO 19119:2008 Amendment 1
- OpenGIS Catalogue Service Implementation Specification
  - Catalogue Service for the Web (CSW)
Overview of Metadata Standards

ISO 19119:2005/Amd.1 2008
ISO 19115:2003/Cor.1 2006
ISO 19136:2007 GML time & geometry

OGC CSW
Overview of Metadata Standards

• ISO 19110:2005 Geographic Information -- Methodology for feature cataloguing
• ISO 19110:2011 Geographic Information -- Methodology for feature cataloguing Amendment 1, Annex E
Overview of Metadata Standards

ISO 19110:2005
ISO 19115:2003/Cor.1 2006
ISO 19136:2007 GML time & geometry
ISO 19110:2005/Amd.1 2011 Annex E
Overview of Metadata Standards

- ISO 19115-2:2009 Geographic Information -- Metadata -- Part 2: Extensions for imagery and gridded data
Overview of Metadata Standards

ISO 19115-2:2009
ISO 19115:2003/Cor.1 2006
ISO 19136:2007 GML time & geometry

ISO 19139-2:2012
Overview of Metadata Standards

- A few profiles of ISO 19115:2003
  - Australia-New Zealand Profile
  - INSPIRE Metadata Directive
  - North American Profile (NAP)
  - UK GEMINI
  - DISDI Geospatial Metadata Profile (DGMP)
  - Energy Industry Profile of ISO 19115-1
Overview of Metadata Standards

1. Identification Information
   - Some coded domain values
2. Data Quality Information
3. Spatial Data Organization Information
   - Some coded domain values
4. Spatial Reference Information
5. Entity and Attribute Information
6. Distribution Information
   - Some coded domain values
7. Metadata Information
8. Citation Information
   - Some coded domain values
9. Time Period Information
10. Contact Information

Extensions for Remote Sensing Metadata
Overview of Metadata Standards

• ISO 19115:2003 under revision
  - Revised as ISO 19115-1—work to complete Dec.?
  - ISO 19139 will be revised as 19115-3

• ISO 19110:2005 under revision—work in progress
Overview of Metadata Standards

• XML Schemas associated with implementation specifications published on the web
  - No one location with all schemas
  - TC 211 XML Management Committee to create new single repository
Overview of Metadata Standards

- Profiles may provide Schematrons to validate profile-specific rules
  - Run Schematrons as XSLTs
  - Microsoft technology used by ArcGIS only supports XSLT 1.0
Before "metadata" term

Early advocate for "metadata"
(data documentation/properties/digital marginalia)

FGDC CSDGM

Participate in CSDGM development

Full CSDGM support in ArcCatalog

Participate in ISO 19115 development

Early support for Draft ISO 19115

ISO 19115:2003

Lead and participate in 19139 development

Create ISO-compliant XML

Full implementation of profiles

Participate in development and prepare for support

ISO Metadata revision

ISO 19115-1

ISO 19139:2007
ArcGIS Metadata Standards Support

- **Content Standard for Digital Geospatial Metadata (CSDGM)**
  - Content associated with ISO 19110:2005
ArcGIS Metadata Standards Support

- Profiles
  - North American Profile of ISO 19115:2003 (NAP)
  - INSPIRE Metadata Directive
- Both are based on ISO 19115/19139
- Both reference ISO 19119 content
ArcGIS Metadata Standards Support

- Content stored in the ArcGIS metadata format
- Includes all concepts for supported standards and profiles
ArcGIS Metadata Standards Support

- Author metadata content in ArcGIS
- Export metadata to standard format
- Validate metadata for standard
- Publish to metadata catalog
ArcGIS Metadata Standards Support

- A flexible system that adapts to changing standards
- Enhances interoperability
Set the Metadata Style

- Metadata styles
  - Filter the full set of concepts
  - Associated with metadata standards
  - Set in Options dialog box
Set the Metadata Style
Set the Metadata Style

- Adds or removes pages

ISO-based styles add Spatial Reference page
Set the Metadata Style

- Adds or removes elements on a page

NAP style adds required country code

Removes hierarchy level name
Set the Metadata Style

- Changes values in some drop-down lists

INSPIRE has fewer codelist values
Set the Metadata Style

- Validation rules are appropriate

ISO 19139

FGDC
Author Metadata Content

• Messages based on standard conditions and guidelines
• Provide content indicated by editor
• Messages change as you type
Author Metadata Content
Author Metadata Content
Leveraging Metadata Standards in ArcGIS for Interoperability
Export Content to Standard Format

- Export to standard format XML file
  - Export button in Description tab
  - Export Metadata gp tool
- Converts ArcGIS metadata to standard XML format
- Result stored in a stand-alone XML file
Validate Content with Standard Schema

- Validate exported file using XML schema
  - Validate button in Description tab
  - Validate Metadata gp tool
- Validate file using Microsoft .NET Framework XML capabilities
  - Provides warning and error messages
Publish Exported Metadata File

- Publish standard-format XML file to a metadata catalog
ArcGIS Metadata Standards Support

- Change the metadata style
  - Edit metadata, check if other content required
  - Export metadata to another standard format
  - Validate metadata for another standard
  - Publish to another metadata catalog
ArcGIS Metadata Standards Support

ARC GIS Metadata

FGDC CSDGM XML

ISO 19139 XML

ISO 19139 (NAP) XML

ISO 19139 (INSPIRE) XML
FGDC CSDGM Metadata Style

- Prompt to upgrade 9.3.1 FGDC CSDGM-format metadata
  - Content appears at the bottom of metadata display
  - Read-only in the Description tab
- Allow ArcGIS to automatically update content
FGDC CSDGM Metadata Style

• Help topics address
  - Details about providing content, e.g. “None”
  - Producing additional CSDGM file formats
  - Converting CSDGM-format text file to XML format
FGDC CSDGM Metadata Style

• Validate button: validates using online FGDC XML DTD
• Validate with mp
  - Export to CSDGM XML file
  - Run USGS MP Metadata Translator tool with Conversion Type = None
  - Warning and error messages produced by mp
ISO 19139 Metadata Style

• Validate button: validates using online ISO XML Schemas
  - http://www.isotc211.org/schemas/2005
  - One of six official schema repositories
  - Require GML 3.2.0 namespace
  - First set of schemas published
ISO 19139 Metadata Style

- NOAA ISO metadata webinars
  - Validate with custom set of ISO XML Schemas
  - Require GML 3.2.1 namespace
  - Exported XML files don’t validate with these schemas because of namespace difference
North American Profile (NAP) Style

- Additional codelist values and mandatory elements
  - Supports tighter transition from CSDGM
- NAP-specific rules available in the editor
- No NAP-specific XML Schemas
- Exported metadata validates with ISO 19139 for data or CSW for services
INSPIRE Metadata Directive Style

- Supports creating ISO metadata that conforms to the INSPIRE Metadata Directive
- Limited codelist values in the editor as appropriate
- INSPIRE-specific rules available in the editor
- Exported metadata validates with ISO 19139 for data or CSW for services
Other ISO Standards and Profiles

- Complete ISO 19139 content is supported with the ISO 19139 metadata style
- Follow the rules for your standard or profile, ignoring 19139-specific rules as appropriate
Other ISO Standards and Profiles

- Use the ArcGIS Metadata Toolkit to customize the ArcGIS metadata editor
  - Download from support.esri.com
  - Create a custom metadata style
  - Documents the ArcGIS metadata format
Other ISO Standards and Profiles

- Code for all pages in the metadata editor
  - C# WPF application with XAML forms
  - Modify elements on existing pages
  - Add custom pages
  - Change codelist values
  - Change validation rules

- Programming guide
- Sample project
What’s Next for ArcGIS?

• Will add support for ISO 19115-1 when it has been finalized and an XML Schema is available
  - Possibly support ISO 19115-2 at the same time
• Will update ArcGIS for Desktop to use schemas from new repository when it is available
  - Will use GML 3.2.1 namespace
Leveraging Metadata Standards in ArcGIS for Interoperability

- Data interoperability requires metadata interoperability
- Metadata important in ArcGIS for Desktop
  - Can be customized
  - Supports many standards, versions of “ISO metadata”
  - The best tool for anyone concerned with interoperability
Leveraging Metadata Standards in ArcGIS for Interoperability
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Remaining metadata sessions at this UC

- Working with Metadata in ArcGIS
  - 8:30 - 9:45 Room 05 A

- Metadata Special Interest Group meeting
  - 5:30 - 7:00 Room 12
Thank you...

Please fill out the session evaluation

**Offering ID: 1181**

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