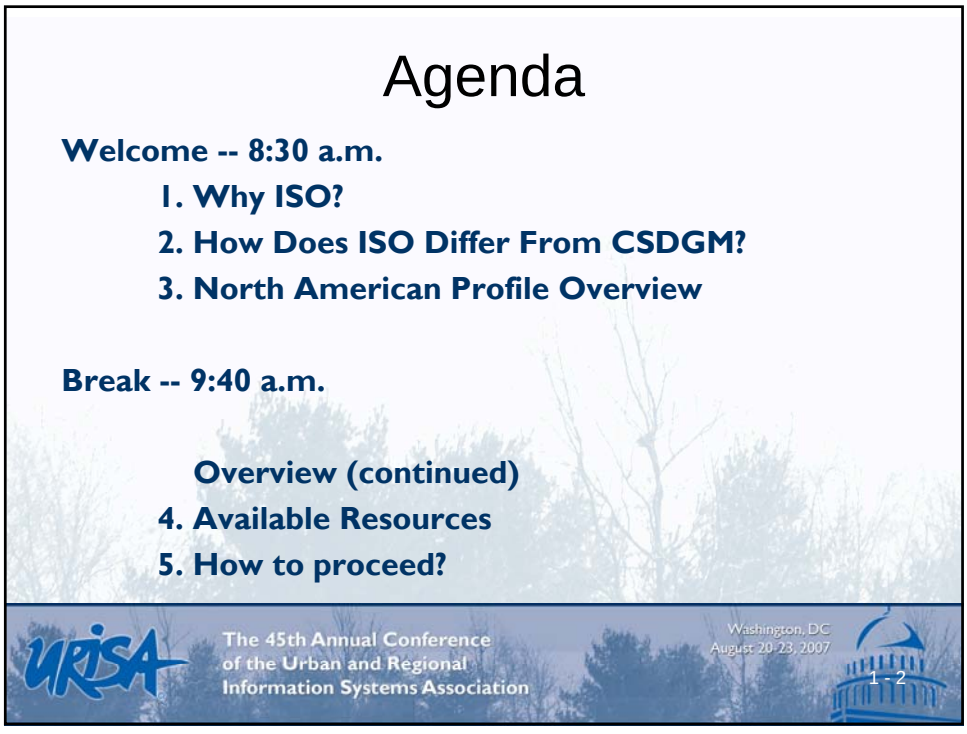
URISA
Washington, DC
August 20-23, 2007
Making the Transition to International Metadata
Sharon Shin, FGDC Metadata Coordinator
Bruce Westcott, Intergraph Corporation
Lynda Wayne, GeoMaxim/FGDC
Organization
Presenter


Agenda
Welcome -- 8:30 a.m.
1. Why ISO?
2. How Does ISO Differ From CSDGM?
3. North American Profile Overview
Break -- 9:40 a.m.
Overview (continued)
4. Available Resources
5. How to proceed?
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Why ISO?

Metadata for….
Profile why…
Profile what…
Profile how…

ISO 19115

Enables describing:

- Geospatial data sets.
- Maps.
- Non-geospatial resources.
- Services: portals, web mapping services.

Profile-A standard tailored for a "Community".

Standard		Profile
Broad/complex	→	Narrow focus/often simpler
Generic	→	Specific
Optional	→	Mandatory
Undefined domains	→	Explicit Domains – codelists
	→	Directs implementation

Harmonizing to a Standard

Multiple standard use.

Varied level of content.

Long history of working with Canada.

Our resource do not know boundaries.

Emphasis

Data Quality

Maintenance

North American Profile - ISO 19115

Goal.

- **Meet the geospatial metadata implementation needs of the US through the development of a Profile guidance document.**

Objectives.

- **Comprehensive profile.**
- **Identical content with Canadian Profile.**
- **Release by ANSI same date and time as CSB.**
- **Results in North American Profile: NAP**

North American Profile: Approach

- No new attributes.
- Increase obligations.
- Modify codelists…deprecate
- Create new codelists for free text fields.
- Recommend structure with in text fields e.g. address.
- Modify/simplify diagrams.
- Adding best practices to guide implementation.

Agenda

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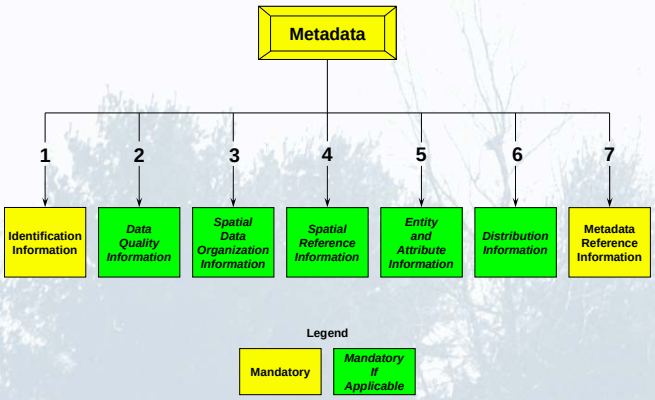
FGDC/CGSDM Metadata Content Sections



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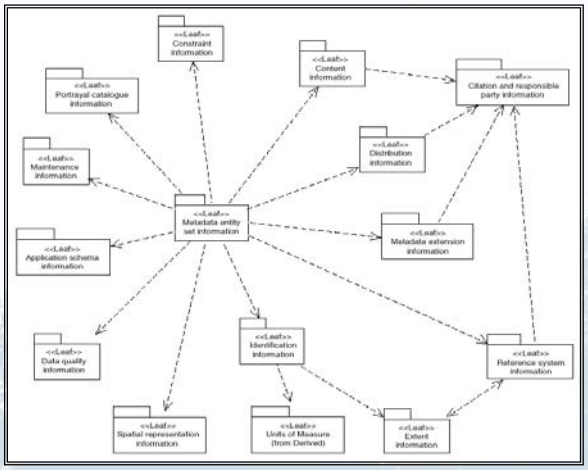
ISO-19115 Metadata UML packages



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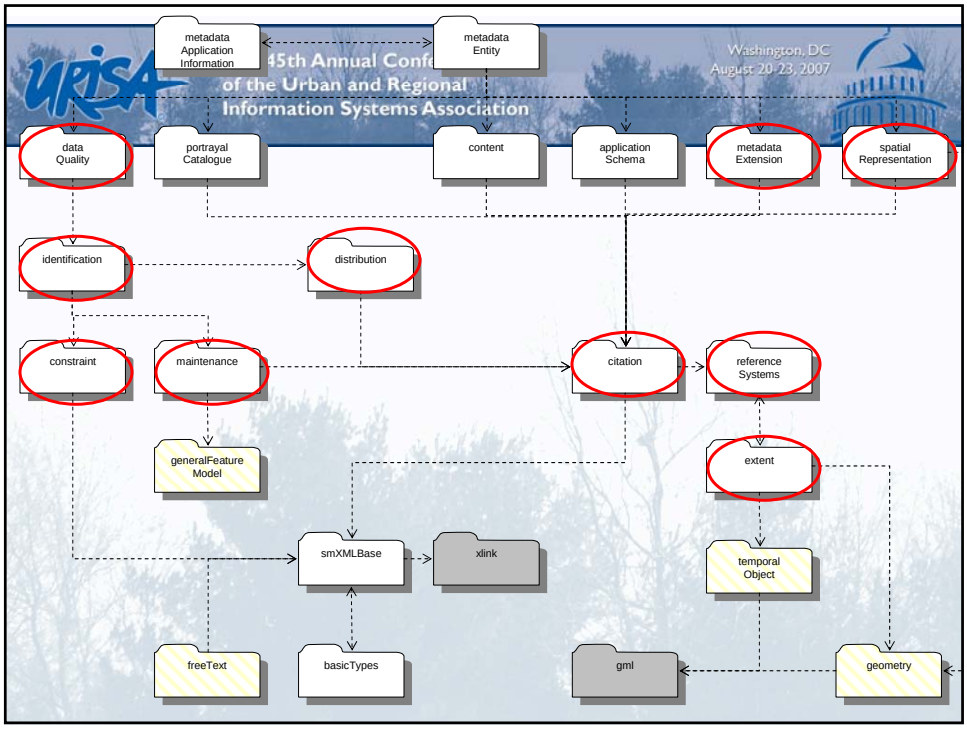

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Some Format Differences:

- **ISO uses datatypes.**
- **Examples:**
  - –Binary
  - –Boolean
  - –Character String
  - –Date
  - –DateTime
  - –Decimal
  - –Distance
  - –Generic Name
  - –GF_AttributeType
  - –GF_FeatureType
  - –GM_Object
  - –GM_Point
  - –Integer
  - –Measure
  - –MemberName
  - –Real
  - –Record
  - –RecordType
  - –SC_CRS
  - –Sequence
  - –TM_PeriodDuration
  - –TM_Primitive
  - –Type
  - –UnitOfMeasure
  - –UomLength
  - –URL

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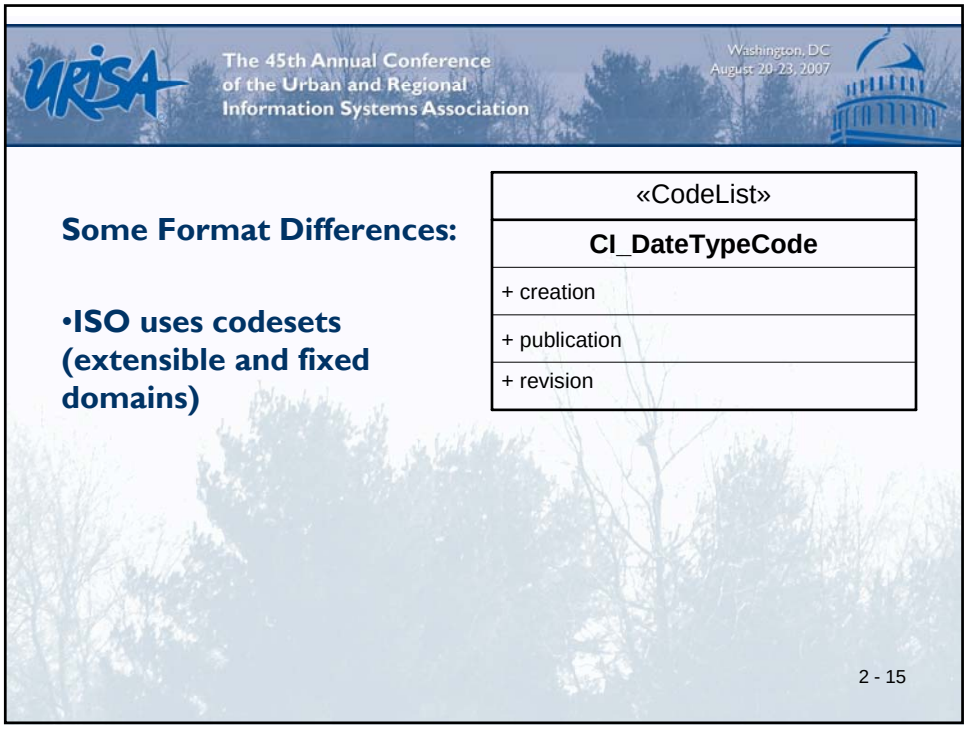
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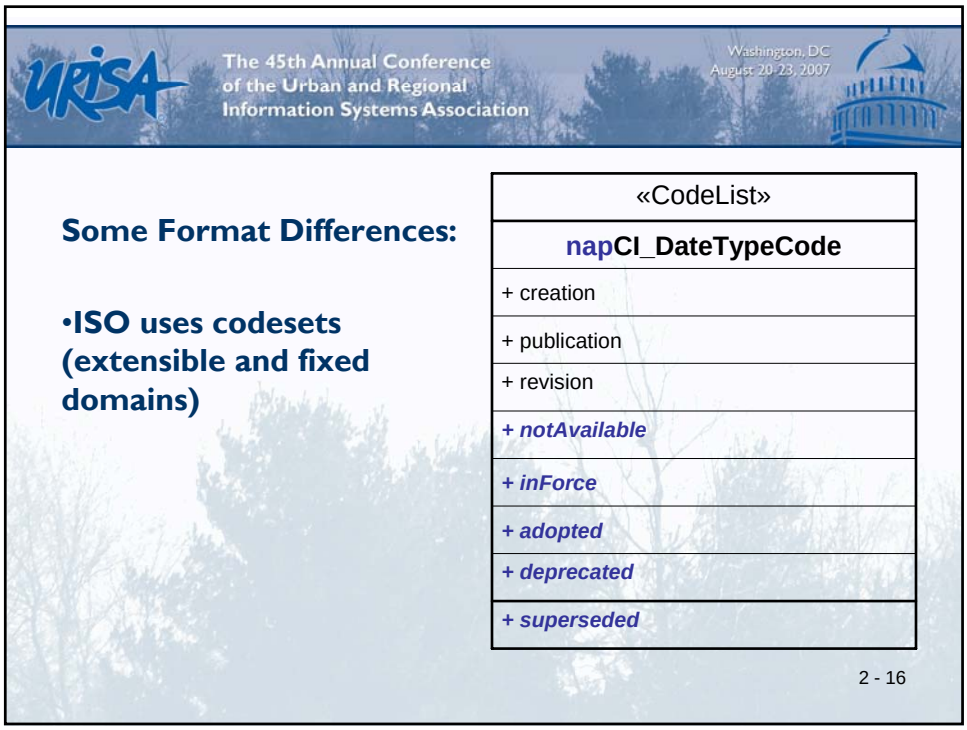
Some Format Differences:
•ISO uses codesets (extensible and fixed domains)
«CodeList»
CI_DateTypeCode
+ creation
+ publication
+ revision
2 - 15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Some Format Differences:
•ISO uses codesets (extensible and fixed domains)
«CodeList»
napCI_DateTypeCode
+ creation
+ publication
+ revision
+ notAvailable
+ inForce
+ adopted
+ deprecated
+ superseded
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Some Format Differences:

- Multiplicity of a metadata component class or attribute.
  - –(O) Optional, maximum 1
  - –(M) Mandatory, maximum 1
  - –(C) Conditional, maximum 1
  - –(O, *) Optional, Repeatable
  - –(M, *) Mandatory, Repeatable
  - –(C, *) Conditional, Repeatable

–**Mandatory**: obligation to provide the information.

–**Conditional**: obligation to provide the information subject to a predefined rule.

–**Optional**: freedom to provide or not the information.

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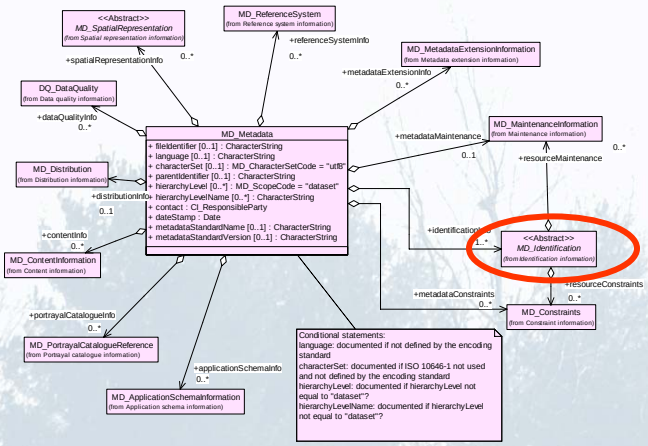
An Example: UML Entities & Relationships



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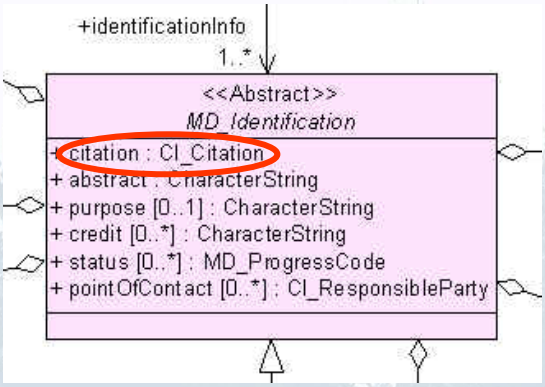
Identification Information includes Citation Information



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Citation Information includes Title, Date, and Optional Information

Class: CI_Citation	
Mandatory:	**Optional:**
Title *(free text)*	Alternate title
Date *(Class: CI_Date)*	Edition & Edition date
	Identifier & ID type
	Other Citation Details
	Collective Title

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Items with unambiguous FGDC source fields

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Some ISO values "crosswalk" from FGDC values

Class: CI_Citation	
ISO *(free text)*:	**FGDC:**
Title	8.4 title
Date	8.2 pubdate*
Other Citation Details	8.9 othercit
Collective Title	8.11 lworkcit

*if the value is in date format

*What about if it is "Unknown"?

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Some ISO values must be **interpolated or user-defined**

Class: CI_Date	
Date	Y-M-D *(ISO 8601)*
Date Type	CI_DateTypeCode

Date Type	Code
Creation date	001
Publication date	002
Revision date	003

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Metadata expressed in FGDC.XML

```
      </timeinto>
    </availabl>
  </distinfo>
- <metainfo>
    <metd>20010209</metd>
    <metrd>20010209</metrd>
    <metfrd>20010808</metfrd>
  - <metc>
    - <cntinfo>
      - <cntperp>
          <cntper>Robert Rossignol</cntper>
          <cntorg>Canada Centre for Remote Sensing, Natural Resources Canada</cntorg>
        </cntperp>
        <cntpos />
      - <cntaddr>
          <addrtype>mailing and physical address</addrtype>
          <address>GeoAccess Division 615 Booth Street, Room 650</address>
          <city>Ottawa</city>
          <state>Ontario</state>
          <postal>K1A 0E9</postal>
          <country>Canada</country>
        </cntaddr>
        <cntvoice>+01-613-943-2917</cntvoice>
        <cnttdd />
        <cntfax>+01-613-947-2410</cntfax>
        <cntemail>robert.rossignol@ccrs.nrcan.gc.ca</cntemail>
        <hours />
        <cntinst />
      </cntinfo>
    </metc>
    <metstdn>FGDC Content Standards for Digital Geospatial Metadata</metstdn>
    <metstdv>1994-06-08</metstdv>
    <mettc>local time</mettc>
    <metac />
    <metuc />
  - <metsi>
      <metscs />
```

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Metadata expressed in ISO-19139.XML

```
<?xml version="1.0" encoding="UTF-8" ?>
- <gmd:MD_Metadata xmlns:gmd="http://www.isotc211.org/2005/gmd">
  - <fileIdentifier>
      <gco:CharacterString xmlns:gco="http://www.isotc211.org/2005/gco">Foreign Lake.xml</gco:CharacterString>
    </fileIdentifier>
  - <contact>
    - <gmd:CI_ResponsibleParty>
      - <individualName>
          <gco:CharacterString xmlns:gco="http://www.isotc211.org/2005/gco">Robert Rossignol</gco:CharacterString>
        </individualName>
      - <organisationName>
          <gco:CharacterString xmlns:gco="http://www.isotc211.org/2005/gco">Canada Centre for Remote Sensing, Natural Resources
          Canada</gco:CharacterString>
        </organisationName>
      - <positionName>
          <gco:CharacterString xmlns:gco="http://www.isotc211.org/2005/gco" />
        </positionName>
      - <contactInfo>
        - <gmd:CI_Contact>
          - <phone>
            - <gmd:CI_Telephone>
              - <voice>
                  <gco:CharacterString xmlns:gco="http://www.isotc211.org/2005/gco">+01-613-943-2917</gco:CharacterString>
                </voice>
              - <facsimile>
                  <gco:CharacterString xmlns:gco="http://www.isotc211.org/2005/gco">+01-613-947-2410</gco:CharacterString>
                </facsimile>
              </gmd:CI_Telephone>
            </phone>
          - <address>
            - <gmd:CI_Address>
              - <deliveryPoint>
                  <gco:CharacterString xmlns:gco="http://www.isotc211.org/2005/gco">GeoAccess Division 615 Booth Street, Room
                  650</gco:CharacterString>
                </deliveryPoint>
              - <city>
```

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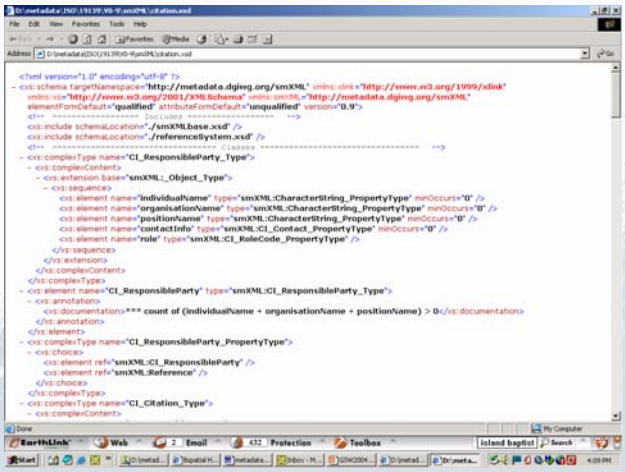
XML must comply with Schema



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Whew!!

End of UML, XML and Schema!

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Agenda

Welcome -- 8:30 a.m.

1. Why ISO?
2. How Does ISO Differ From CSDGM?
3. **North American Profile Overview**

Break -- 9:40 a.m.

Overview (continued)

4. Available Resources
5. How to proceed?

Elements Eliminated

4.1.1.1 Latitude Resolution
4.1.1.2 Longitude Resolution
4.1.1.3 Geographic Coordinate Units
4.1.2.4.3.1 Distance Resolution
4.1.2.4.3.2 Bearing Resolution
4.1.2.4.4 Planar Distance Unit
5.1.2.5 Beginning Date of Attribute Values
5.1.2.6 Ending Date Of Attribute Values
5.1.2.8 Attribute Measurement Frequency
6.4.2.2.1.2 Access Instructions

ISO Standards in ISO 19115

The NAP editing team includes content from the referenced standards to enable users to implement the NAP without procuring the referenced standards.

- **Language Codes**
- **County Codes**
- **Conceptual Schema Language**
- **Profiles**
- **Spatial Schema**
- **Temporal Schema**
- **Rules for Application Schema**
- **Methodology for Feature Cataloging**
- **Spatial Referencing by Coordinates**
- **Quality Principles**
- **Quality Evaluation Procedures**
- **Metadata, Technical Corrigendum**
- **Encoding**
- **Services**
- **Geographic Information Services**
- **Geodetic codes and Parameters**
- **Location Based Services- Tracking and Navigation**
- **GML**
- **XML**
- **OGC's Web Services Common Specification**

Organization and Terminology

FGDC	ISO / NAP
Sections	Classes
Elements	Subclasses
Compound Elements	Attributes
Domains	Domains

NAP Classes

Metadata Entity Set Information

Identification Information

Dataset Identification

Service Identification

Constraints

Data Quality Information

Maintenance Information

Spatial Representation Information

Reference System Information

Content Information

Portrayal Catalogue Information

Distribution Information

Application Schema Information

NAP Codelist

Codelist that have been altered, added codes or deprecated codes, will have titles such as:

napMD_ProgressCode

Metadata Entity Set Information

- File Identifier (M)
- Language (M)
- Character set (M)
- Parent Identifier
- Hierarchy Level (M)
- Contact (M)
- Date Stamp (M)
- Metadata Standard Name (M)
- Metadata Standard Version
- Data Set URI
- Locale (C)

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Identification Information
Data Identification

- Citation (M)
- Abstract (M)
- Status (M)
- Language (M)
- Topic Category (C)
- Extent (C)

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Service Metadata

- Citation (M)
- Abstract (M)
- Status (M)
- Service Type (M)
- Coupling Type (M)
- Coupled Resources (O)
- Subclasses
  - Operates on

Constraints

Use Limitations (O)

Legal Constraints
- Use limitations
- Access constraints
- Use constraints
- Other constraints (C)

Security Constraints
- Use Limitations
- Classification (M)
- User Notes
- Classification System
- Handling Description

Data Quality

Scope (M)

Report (C)
- Completeness
- Logical Consistency
- Positional
- Consistency
- Thematic Accuracy
- Temporal Accuracy

Lineage (C)
- Source
- Process Step

Maintenance Information

Maintenance and Update Frequency (M) – code list

Date of Next Update

User Defined Maintenance Frequency

Updated Scope

Update Scope Description

Maintenance Note

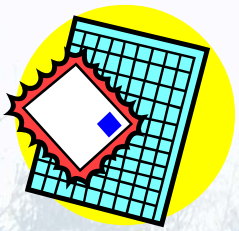
Contact – responsible party

Spatial Representation

Grid Spatial Representation

- Number of Dimensions
- Axis Dimension Properties
- Cell geometry
- Transformation Parameter Availability

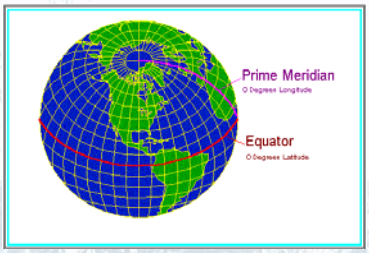
Vector



Reference System Information

Reference System Identifier

code

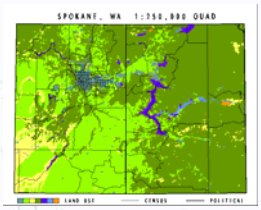


Peter H. Dana

Content Information

Feature Catalog
- Included with dataset
- Feature types
- Feature Catalog Citation

Coverage Description
- Attribute description
- Content type
  - Subclasses



http://edc.usgs.gov/products/landcover/lulc.html

http://erg.usgs.gov/isb/pubs/booklets/aerial/aerial.html

ISO 19110 Feature Catalog Methodology

Feature Catalog- citation type info

Feature Type
- **Name**
- **Definition**
- **Code**

Feature Operation, Feature Attribute, Feature Attribute Value, Feature Association

ISO 19110 Feature Catalog Methodology

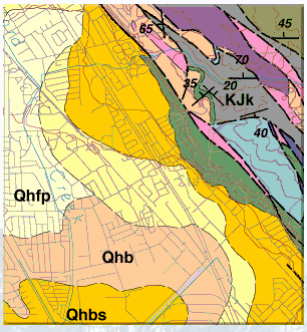
Feature type example - Administrative boundary
- **Definition Nonphysical line indicating the extent of …**
- **Code 2145**
- **Feature Attribute Name - Administrative level**

Feature Attribute
- **Name- Administrative Level**
- **Definition – The administrative enclosed by the boundary**
- **Code 145**
- **Value type Character**
- **Domain type 1 (binary yes no)**

Feature Attribute Values
- **Label Code Definition**
- **Country**
- **…**

Portrayal Catalogue

Information to reproduce a map:
- Line weight
- Color
- Font
- Etc.



http://wrgis.wr.usgs.gov/parks/gmap/

Application Schema

Name (M)
Schema language (M)
Constraint language (M)
Schema ASCII
Graphics file
Software development file
Software development file format

```
<Feature typeName="Road">
<description>Georgia
Street</description> <property
typeName="numberLanes"
type="integer">4</property>
<geometricProperty
typeName="linearGeometry">
<LineString srsName="EPSG:4326">
<coordinates> 0.0,100.0 100.0,0.0
</coordinates> </LineString>
</geometricProperty> </Feature>
```


Metadata Entity Set Information

7 mandatory attributes

Class Name	Obligation (Mandatory attributes / Mandatory subclasses)
Identification Information	**M (M6/)**
Data Identification	**C (M6/)**
Service Identification	**C (M5/M1)**
Constraints	**O**
Data Quality Information	**O(M1/)**
MD Maintenance	**O (M1/)**
Spatial Representation	**O ()**
Reference System Information	**C (M1/M1)**
Content Information	**O (C2/)**
Portrayal Catalog	**O (M0 / M1)**
Distribution Information	**O ()**
Application Schema	**O(M3/)**

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Break -- 9:40 a.m.

Overview (continued)

4. **Available Resources**
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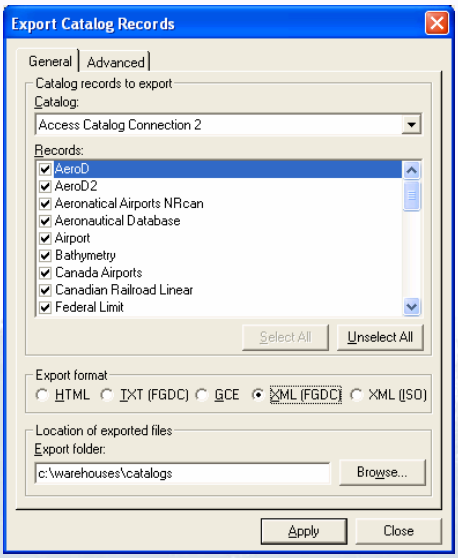
FGDC→ISO Transformation :

Demonstrate GM Catalog XML Export:



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What is XSLT?

"XSLT is a language for transforming XML documents into other XML documents."

- XSLT is designed for use as part of XSL, which is a stylesheet language for XML.
- XSLT is not intended as a completely general-purpose XML transformation language.
  - Source: http://www.w3.org/TR/xslt

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FGDC_to_ISO.XSLT

```
-->
- <xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform" xmlns:gml="http://www.opengis.net/gml"
  xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:gco="http://www.isotc211.org/2005/gco"
  xmlns:fo="http://www.w3.org/1999/XSL/Format">
  <xsl:output method="xml" version="1.0" encoding="UTF-8" indent="yes" />
 - <xsl:template match="metadata">
  - <xsl:element name="gmd:MD_Metadata">
   - <xsl:element name="fileIdentifier">
    - <xsl:element name="gco:CharacterString">
      <xsl:value-of select="concat(./idinfo/citation/citeinfo/title,'.xml')" />
     </xsl:element>
    </xsl:element>
    <xsl:apply-templates select="smusrdef/smusrliv[smusrlbl='MD_Language']" />
    <xsl:apply-templates select="smusrdef/smusrliv[smusrlbl='MD_Character_Set']" />
   - <xsl:element name="contact">
     <xsl:apply-templates select="/metadata/metainfo/metc" />
    </xsl:element>
    <xsl:element name="dateStamp">
     - <xsl:element name="gco:Date">
       <xsl:value-of select="./metainfo/metd" />
      </xsl:element>
    </xsl:element>
   - <xsl:element name="metadataStandardName">
    - <xsl:element name="gco:CharacterString">
      <xsl:text>ISO-19115:2003(E) derived from</xsl:text>
     - <xsl:if test="string-length(./metainfo/metstdn)!=0">
       <xsl:value-of select="./metainfo/metstdn" />
      </xsl:if>
     - <xsl:if test="string-length(./metainfo/metstdn)=0">
       <xsl:text>FGDC Content Standards for Digital GeoSpatial Metadata</xsl:text>
      </xsl:if>
     </xsl:element>
    </xsl:element>
```

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Replacement with a “Literal”

```
- <xsl:element name="dateStamp">
      - <xsl:element name="gco:Date">
            <xsl:value-of select="./metainfo/metd" />
        </xsl:element>
  </xsl:element>
```

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FGDC_to_ISO.XSLT

```
 -->
- <xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform" xmlns:gml="http://www.opengis.net/gml"
   xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:gco="http://www.isotc211.org/2005/gco"
   xmlns:fo="http://www.w3.org/1999/XSL/Format">
   <xsl:output method="xml" version="1.0" encoding="UTF-8" indent="yes" />
  - <xsl:template match="metadata">
    - <xsl:element name="gmd:MD_Metadata">
      - <xsl:element name="fileIdentifier">
        - <xsl:element name="gco:CharacterString">
            <xsl:value-of select="concat(./idinfo/citation/citeinfo/title,'.xml')" />
          </xsl:element>
        </xsl:element>
        <xsl:apply-templates select="smusrdef/smusrliv[smusrlbl="MD_Language"]" />
        <xsl:apply-templates select="smusrdef/smusrliv[smusrlbl="MD_Character_Set"]" />
      - <xsl:element name="contact">
          <xsl:apply-templates select="/metadata/metainfo/metc" />
        </xsl:element>
      - <xsl:element name="dateStamp">
        - <xsl:element name="gco:Date">
            <xsl:value-of select="./metainfo/metd" />
          </xsl:element>
        </xsl:element>
      - <xsl:element name="metadataStandardName">
        - <xsl:element name="gco:CharacterString">
            <xsl:text>ISO-19115:2003(E) derived from</xsl:text>
          - <xsl:if test="string-length(./metainfo/metstdn)!=0">
              <xsl:value-of select="./metainfo/metstdn" />
            </xsl:if>
          - <xsl:if test="string-length(./metainfo/metstdn)=0">
              <xsl:text>FGDC Content Standards for Digital GeoSpatial Metadata</xsl:text>
            </xsl:if>
          </xsl:element>
        </xsl:element>
```

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Replacement with a “String”

```
<xsl:element name="metadataStandardName">
  - <xsl:element name="gco:CharacterString">
       <xsl:text>ISO-19115:2003(E) derived from</xsl:text>
      - <xsl:if test="string-length(./metainfo/metstdn)!=0">
            <xsl:value-of select="./metainfo/metstdn" />
        </xsl:if>
      - <xsl:if test="string-length(./metainfo/metstdn)=0">
            <xsl:text>FGDC Content Standards for Digital GeoSpatial Metadata</xsl:text>
        </xsl:if>
    </xsl:element>
</xsl:element>
```

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ISO Metadata Editor Status

Variety of ISO editors in production and use:

Availability
- freeware
- proprietary

Format:
- stand-alone
- GIS-embedded

Content:
- ISO core
- ISO core+
- ISO complete

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ISO Metadata Editor Tool Review

Criteria for inclusion:

- core+
- English language

Method:

- distributed effort
- online survey / data collection
- review vs. assessment (feature present? y/n)

ISO Metadata Editor Tool Review

Review Elements:

- extent (ISO core, core+, full, related standards, profiles)
- application type (desktop, web-based)
- data storage (file repository, dbase)
- adaptability (open source, templates, libraries)
- output formats (ISO 19139, html, xml)
- operational features (batch, validation, CSDGM input)
- management features (search, replace, status, publish)
- support features (definitions, examples, pick lists)

Available ISO Metadata Editors

GeoNetwork opensource	United Nations
Preludio	disy (Germany)
ISO Metadata Editor(IME)	Spanish National Institute Aerospace Technology
CatMD	Spanish University Consortia
EditM3Cat	GeoConnections/Intelec (Canada)
MetaD (Spain)	University Catalunya (Spain)
GeoMedia Catalog	Intergraph (US)
ArcCatalog	ESRI (US)

NAP Workbook Components

What we have-

NAP Profile

What we want:

Format

Color Graphic

Implementation Guidance

- More best practices
- More examples

Agenda

Welcome -- 8:30 a.m.

1. Why ISO?
2. How Does ISO Differ From CSDGM?
3. North American Profile Overview

Break -- 9:40 a.m.

Overview (continued)

4. Available Resources
5. How to proceed?

ISO Topic Categories

Nineteen high-level subject headings:

boundaries	*oceans*	*health*
transportation	*economy*	*society*
elevation	*farming*	*location*
biota	*structure*	*environment*

geoscientificInformation *inlandWaters*

planningCadastre *intelligenceMilitary*

imageryBaseMapsEarthCover *utilitiesCommunication*

climatologyMeteorologyAtmosphere

ISO Topic Categories

Include ISO Topic Categories as Theme_Keywords:

- include all pertinent Topic Categories
- list most pertinent first
- use text as presented, e.g. inlandWaters
- Thesaurus = 'ISO 19115 Topic Category'

To:

- aid translation to ISO
- map to geodata.gov communities

ISO Topic Categories

For Specific Guidance…

See…

Metadata Quick Guide

http://www.fgdc.gov/metadata/documents/MetadataQuickGuide.pdf

Opportunities for Participation

FGDC Metadata Working Group
Metadata Listserver
NAP Public Review

FGDC Working Group

- **Open to all**
- **Convenes by telecon 3-4 times annually**
- **Topics**
  - NAP Status
  - ISO Tool Review Team
  - Metadata Utility
  - Metadata Implementation and Inspiration
  - Metadata Training Materials & Opportunities
  - Stakeholder Activities

……other metadata topics

FGDC Working Group

To Join…

Contact…

Sharon Shin

FGDC Metadata Coordinator

SShin@USGS.gov

Metadata Listserver

- **Open to all**
- **Low traffic**
- **Challenging Topics**
  - ISO Format and Implementation
  - Metadata Theory
  - Metadata Formats
  - Technical Implementations
  - Organizational Issues

……other thought provoking metadata topics

Metadata Listserver

To Join…

Go To…

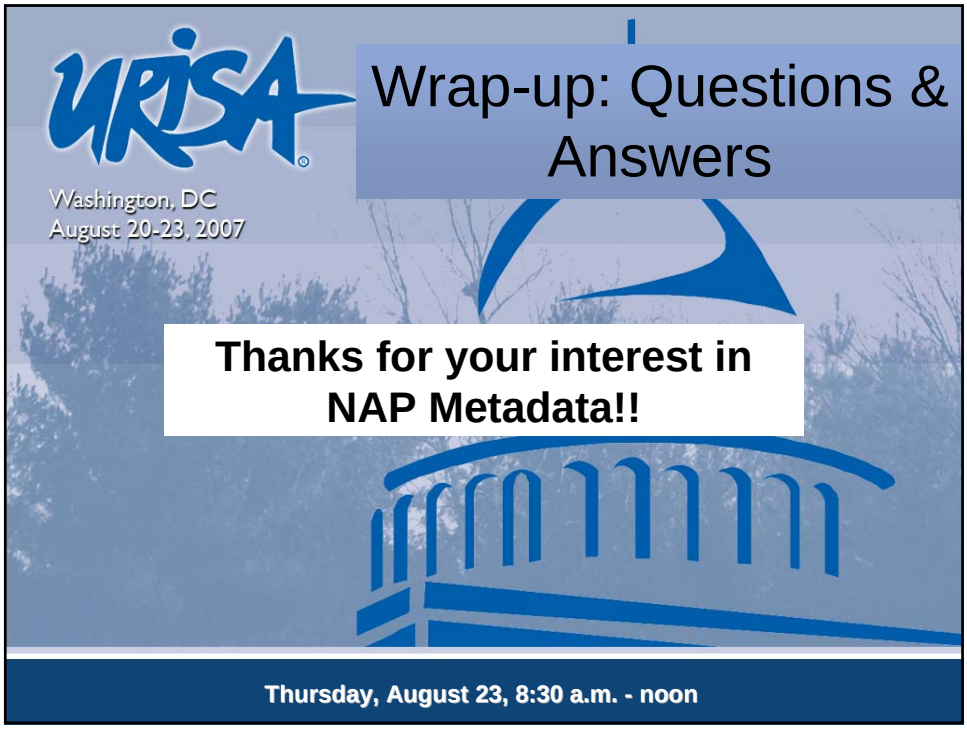
http://lists.geocomm.com/mailman/listinfo/metadata

National Review

Dates:

Website

- **Profile**
- **Comment form**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Wrap-up: Questions & Answers
Thanks for your interest in NAP Metadata!!
Thursday, August 23, 8:30 a.m. - noon