Interoperability, Standards, and Metadata

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**Agenda**

- Interoperability
- Standards
- ISO TC 211
- Metadata?
  - Not just for catalogs
- An introduction to ISO 19115
- Metadata work in ISO TC211
Why Is Interoperability Important?

• No person (or organization) can advance independently
  – Man has survived and prospered through teamwork - interoperating
  – Think globally, act locally
  – Global economy - interoperating on a global scale
• Things are expensive
  – Duplication of effort is wasteful
  – Maximize ROI

Enhanced Interoperability improves:
Communication, Efficiency, Quality
GIS has always required Interoperability

- Geographic analysis
  - Multiple sources, multiple organizations
  - Distributed within a community
  - Merging diverse information types

  and continues to...

- Enterprise GIS
  - GIS evolving beyond isolated communities
  - GIS merging with broader IT infrastructures

- GIS Web Services
  - Enabled by distributed networks
  - Loosely coupled
Interoperability ...

from ISO TC 211

• the ability to **find** information and processing tools, when they are needed, no matter where they are physically located

• the ability to **understand and employ** the discovered information and tools, no matter what platform supports them, whether local or remote

• the ability to **participate in a healthy marketplace**, where goods and services are responsive to the needs of consumers
Varieties of Interoperability

• Technical
• Semantic
• Political/Human
• Legal
• Inter-disciplinary
Interoperability Enablers

- Infrastructure
  - Compatible Technology
- Authorization
- Copyright
- Business Agreements
  - MOUs
- Business Model
  - Pricing/commerce
- Standards
- Security
  - Privacy
- Information Assurance
  - Certification
  - Quality
- Metadata
Standards

As defined by ISO
http://www.iso.ch

- Documented agreements:
  - Technical specifications, precise criteria, rules, guidelines, definitions of characteristics
  - Ensuring materials, products, processes and services are fit for purpose
  - Reference documents used in public contracts or international trade
  - Indisputable reference clarifying the contractual relations between economic partners
- Promote competition, commerce and free trade
Standards and Specifications

- Make things work – affect every aspect of life
- Widespread use of Standards (International)
  - Make things work around the world
  - Increase efficiency - globally
- Developing standards is a lot of work
  - Many organizations involved
  - Take time to develop
  - Complicated
  - 20% technical 80% political
Standards

Political compromise

Democratic mechanism

Consensus technical solutions

Technology transfer

Functions

From H.Tom – *Standards for Enabling International Interoperability*
Participation in Standards

- **Organizationally**
  - International Standards
  - Regional Standards
  - National Standards
  - Information Community Standards
    - NATO ICAO, IHO...

- **Operationally**
  - Platform
  - GIS standards
  - IT/industry standards
ESRI Actively Participates in Interoperability & Standards Organizations

- ISO – International Organization for Standardization
- OGC – Open GIS Consortium
- ANSI/INCITS – American National Standards Institute/International Committee for Information Technology Standards
- OASIS – Organization for the Advancement of Structured Information Standards
- IHO – International Hydrographic Organization
- WS-I – Web Services Interoperability Organization
- OMA – Open Mobile Alliance (formerly LIF)
- WLIA – Wireless Location Industry Association
- FGDC – Federal Geographic Data Committee
- GSDI – Global Spatial Data Infrastructure
- CEN – Committee for European Normalization
- DGIWG – Digital Geographic Information Working Group
- EPSG – European Petroleum Survey Group
- ACSM – American Congress on Surveying and Mapping
- ASPRS – American Society of Photogrammetry and Remote Sensing
- STIA – Spatial Technologies Industry Association
## Standards Organizations

<table>
<thead>
<tr>
<th>Cross Community</th>
<th>Information Communities</th>
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<tbody>
<tr>
<td><strong>Geographic</strong></td>
<td><strong>DGIWG</strong></td>
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<td>FGDC</td>
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<td>CEN</td>
<td>OMA</td>
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<td>ANSI*</td>
<td>WLIA</td>
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<td>ACSM</td>
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<tr>
<td>ASPRS</td>
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</tr>
</tbody>
</table>

### Standard Development
- SGML
- ISO TC211 Spatial Schema

### Specification Development
- Data Models
- Web Services

### Authority

### Coordination

### Lobbying

### Consulting
International Organization for Standardization

- ISO from Greek ISOS meaning “equal”
- Founded in 1947
- 146 member nations
  - 1 member per country (represented through national standards organization – ANSI, DIN, etc)
  - 13700 standards, 3000 technical bodies, 30000 experts
- NGO – unlike UN
  - Delegates not national governments
  - Roots in private sector and industry associations
- Able to bridge the gap
  - Consensus solutions meeting requirements of business and broader needs of society
Hallmark of ISO Brand

- Equal footing
  - Every ISO member institution has right to take part
  - 1 nation – 1 vote regardless of size or economic strength
- Voluntary
  - ISO has no legal authority
  - Adopted by nations – health, safety, etc
- Market driven
  - Developed by experts from industry, technical, business, government, academic
- Consensus
  - Ensures widespread applicability
  - Remain current
Benefits of ISO Standards

• Business/Trade
  – Wide acceptance of products and services
  – Free to compete in broader market
  – Remove technical trade barriers
  – Support political trade agreements

• Government
  – Provides technical and scientific underpinnings for health, safety, environmental legislation

• Consumers
  – Provides assurance about quality, safety, & reliability
  – Contribute to quality of life
The ISO Process

- All work performed in technical committees (TC)
- **Formal Process**
  - Refined over 50 years
  - Stages and timelines fully defined
- **Consensus based**
  - Drafts considered until consensus reached through voting process by members
ISO Development Stages

- Preliminary Stage
- Proposal Stage
- Preparatory Stage
- Committee Stage
- Enquiry Stage
- Approval Stage
- Publication Stage

TC/SC route:

STAGE 1: NP (new work item proposal)

STAGE 2: Building expert consensus

STAGE 3: Consensus building within TC/SC

STAGE 4: Enquiry on DIS (draft international standard)

STAGE 5: Formal vote on FDIS (proof check by secretariat)

STAGE 6: Publication of International Standard

Deliverables:

First CD (Committee draft)

DIS or ISO/TS (Technical Specification)

ISO/TR (Technical Report) for non-normative documents

Final text for processing as FDIS (final draft international standard)

Final text of International Standard

ISO International Standard

NEW!
Standards Development Cycle

The "Standard"

Development

Consensus Building

Review

Maintenance

EXTENSIONS

User/Vendor/Organizational/Industry "Extensions"

Industry-Relevant, Widely-Adopted "Extensions"

"Extensions" Become Input To Next Revision Of Standard

Amendments:
2-3 years
Revisions:
4-5 years
Standardized Profiles
Standards may be simplified/tailored

“...set of one or more base standards or sub-sets of base standards...that are necessary for accomplishing a particular function.”

Conformance to profile = conformance with base standard(s) (Conformance Level 1, Strict Conformance)

• Registered Profiles
  – Internationally Registered (ISP)
  – Nationally Registered

• Published Profiles
  – Formally within Community
  – Informally within Organization
Profiles with extensions

- Standards balance needs of interoperability with needs that exceed requirements of the standard
  - Higher interoperability = lower functionality
  - Higher functionality = lower interoperability
- Extensions lower interoperability outside the community
- Extensions are “out of scope” with respect to base standard
- ISO 19106 - Conformance level 2 – ”conforming”
Extensions and conformance

Extensions → A Conformance Issue

Strictly Conforming Implementation:
Maximum Interoperability; Minimum Functionality

Many Conforming Implementations Are Possible:
Interoperability May Vary

Conforming Implementations:
Less Interoperability, More Functionality
ISO/TC 211 Geographic information/Geomatics
filling the broad range of geographic information requirements

ESRI actively participates through ANSI-INCITS-L1
ISO 6709:1983, Standard representation of latitude, longitude and altitude for geographic point locations

ISO 19101 - Reference model
ISO 19102 – Overview - deleted
ISO/TS 19103 - Conceptual schema language
ISO 19104 - Terminology
ISO 19105 - Conformance and testing
ISO 19106 - Profiles
ISO 19107 - Spatial schema
ISO 19108 - Temporal schema
ISO 19109 - Rules for application schema
ISO 19110 - Feature cataloguing methodology
ISO 19111 - Spatial referencing by coordinates
ISO 19112 - Spatial referencing by geographic identifiers
ISO 19113 - Quality principles
ISO 19114 - Quality evaluation procedures
ISO 19115 - Metadata
ISO 19116 - Positioning services
ISO 19117 – Portrayal
ISO 19118 - Encoding
ISO 19119 - Services
ISO/TR 19120 - Functional standards + new rev
ISO/TR 19121 Imagery and gridded data
ISO/TR 19122 - Qualifications and certification of personnel
ISO 19123 - Schema for coverage geometry and functions
ISO/RS 19124 - Imagery and gridded data components
ISO 19125 - Simple feature access – Part 1-3
ISO 19126 - Profile - FACC Data Dictionary
ISO 19127 - Geodetic codes and parameters
ISO 19128 - Web Map Server Interface
ISO 19129 - Imagery, gridded and coverage data framework
ISO 19130 - Sensor and data model for imagery and gridded data
ISO 19131 - Data product specification
ISO 19132 - Location based services possible standards
ISO 19133 - Location based services tracking and navigation
ISO 19134 - Multimodal location based services
ISO 19135 - Procedures for registration of location based services
ISO 19136 – Geography Markup Language (GML)
ISO 19137 - Generally used profiles of the spatial schema and of similar important other schemas
ISO 19138 - Data Quality Measures
ISO 19139 - Metadata - Implementation Specification
ISO 19140 - Technical amendment to the ISO Geographic information series of standards for harmonization and enhancements

Standards
Access, technology
Content (data)
Organization
Education
Completed Standards
The Building Blocks

- ISO 19101:2002 - Reference model
- ISO 19105:2000 - Conformance and testing
- ISO 19106:2004 - Profiles
- ISO 19107:2003 - Spatial schema
- ISO 19108:2003 - Temporal schema
- ISO 19111:2003 - Spatial referencing by coordinates
- ISO 19112:2003 - Spatial referencing by geographic identifiers
- ISO 19113:2002 - Quality principles
- ISO 19114:2003 - Quality evaluation procedures
- ISO 19115:2003 - Metadata
- ISO 19116:2004 - Positioning Services
- And several technical reports
Draft International Standards

- ISO/DIS 19104 - Terminology
- ISO/DIS 19109 - Rules for application schema
- ISO/FDIS 19110 - Feature cataloguing methodology
- ISO/DIS 19117 - Portrayal
- ISO/DIS 19118 - Encoding
- ISO/DIS 19119 - Services
- ISO/DIS 19123 - Schema for coverage geometry and functions
- ISO/DIS 19128 - Web Map server interface
- ISO/DIS 19133 - Location based services tracking and navigation
- ISO/DIS 19135 - Procedures for registration of items of geographic information
- ISO/PDTS 19139 - Metadata – XML Schema implementation
The Foundation

- Framework/standards infrastructure
  - basic architecture
    - ISO 19101
  - service architecture
    - ISO 19119, etc
- Locate, understand
  - Metadata
    - ISO 19113, 14, 15
- Basic structure
  - Spatial, temporal schemas, CRS definition
    - ISO 19107-8, 9, 11
- Access
  - Simple feature access, ISO 19125
  - Web map services, ISO 19128
- Data content descriptions
  - ISO 19103, 19109, 19110, etc
Geographic Information Standards

- ISO 19100 suite of standards
  - Maturing
  - Providing the basics
  - Adopted by nations
  - Implementation by industry

- ISO TC 211
  - Organizing for the future
  - Addressing broader community issues
  - Maintaining leadership role
an international industry consortium of 250+ companies, government agencies and universities participating in a consensus process to develop publicly available geoprocessing specifications

• Mission
  – Deliver spatial interface specifications that are openly available for global use
From H.Tom – *Standards for Enabling International Interoperability*
Adopted OGC Specifications

- Catalog Interface (CAT)
- Coordinate Transformation Services (CT)
- Filter Encoding (Filter)
- Geography Markup Language (GML 3.0)
- Grid Coverages (GC)
- Location Services (OpenLS)
- Simple Features – CORBA (SFC)
- Simple Features – SQL (SFS)
- Simple Features – OLE/COM (SFO)
- Styled Layer Descriptor (SLD)
- Web Coverage Service (WCS)
- Web Feature Service (WFS)
- Web Map Context Documents (WMC)
- Web Map Service (WMS)
Information Technology Standards

Leading the web to its full potential

- **XML** - Extensible Markup Language
  - Profile of SGML (ISO 8879)
- **WSDL** - Web Services Description Language
  - An XML language for describing Web services
- **SOAP** - Simple Object Access Protocol
  - A lightweight protocol for exchanging information
W3C Service Oriented Architecture*

*From Web Service Architecture, 14 Nov. 2002
ESRI’s Metadata Portal Architecture

OGC Catalog Services (Z39.50 CS-W)

Portal

Users

GIS Web Services Providers

GIS Data Providers

GIS Data

FTP

OGC WMS, WFS, WCS Mif, Shp . . .

Search Catalog and Find

Connect and Use

Download and Use

Publish GIS data and services

Document in catalog

OAI Protocol for Metadata Harvesting

ISO 19115 Metadata/
ISO 19139 Metadata
XML Schema Implementation
Portal Standards

- ISO 19115: 2003 Geographic Information - Metadata
  - ISO 19139 Metadata XML Schema Implementation
- OAI-PMH Open Archives Initiative Protocol for Metadata Harvesting 2.0
- OpenGIS® Catalog Services Implementation Specification (CAT 2.0)
  - Http Protocol Bindings – Catalog Services-Web
- OpenGIS® Web Map Service Implementation Specification (WMS) 1.3
• **Data about Data**

• **Documentation that describes information (data) so it can be understood**

• **Insures the right data for the right purpose**
  – is used correctly

**Geospatial data has a long history using Metadata**
# Metadata Environment

<table>
<thead>
<tr>
<th>Application</th>
<th>Catalog</th>
<th>Processing Support</th>
<th>Historical Record</th>
<th>Understand Data</th>
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</thead>
<tbody>
<tr>
<td>Locate</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
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<tr>
<td>Evaluate</td>
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<td>X</td>
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<tr>
<td>Extract</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employ</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Catalog Environment

- Product Catalog
  - Printed
  - On-line
- Portals
- Clearinghouse
  - Searching
  - Browsing
- Data Warehouse
  - Management
User Environment

- **Locate**
  - Understand the Model
    - How features are represented
    - Connectivity
  - Understand the Content
    - Why features are included or excluded
  - Understand the Point-of-View
    - Business/Commercial
    - Environmental/Scientific
    - Military/Defense/Intel

- **Evaluate**

- **Employ**
• **Support user Decisions**
  - Identify multiple datasets within an application
  - Know the good and bad areas
  - Merging data (which is the better data?)
    - Currentness
    - Quality

• **Support Computer Processing**
  - Application software functions
  - Capabilities, access
  - Guide software through the data
Historical records

Locate  Evaluate

• Production Management
  – Planning - setting priorities
  – Coordinating production
  – Storage/Archival

• Legal Records
  – Proper use
  – Document assumptions
Metadata perspectives

• **Why is metadata more important now?**
  – Expansion in the use of Geographic Information
    – Proliferation of data
    – Non-geographers using geospatial data
    – The producer is not the user
  – Geospatial data is imperfect
    – A model, a “point of view”
    – Assumptions, limitations, approximations, simplifications
  – Geospatial data is expensive
    – Reuse
    – Data management

• **Why should it be standardized?**
  – Provide an understanding of data – around the Globe and across information communities
INTERNATIONAL STANDARD

ISO 19115

First edition
2003-05-01

Geographic information — Metadata
Information géographique — Métdonnées
ISO 19115:2003

**Scope**

- ...the schema required for describing geographic information and services.
- ...information about the identification, the extent, the quality, the spatial and temporal schema, spatial reference, and distribution of digital geographic data.
- ...applicable to the cataloguing of datasets, clearinghouse activities, and the full description of datasets for a wide range of geographic applications.
- ...applicable to geographic datasets, dataset series, and individual geographic features and attributes
- ...may be used for other forms of geographic data such as map, charts, textual documents
• Defines *metadata elements*;
• Provides a *schema (UML)*;
• Establishes a common set of metadata terminology, definitions (*data dictionary*);
• Provides extension procedures
Regional metadata standards


- Content Standard for Geospatial Metadata Federal Geographic Data Committee, June 8, 1994, Washington DC

Other influential documents

- Digital Geographic Information Exchange Standard (Digest), Version 1.2. Digital Geographic Information Working Group, January 1994,

- IHO Transfer Standard for Digital Hydrographic Data, International Hydrographic Bureau, October 1995, Monaco

- Spatial Data Transfer Standard (SDTS), US Department of Commerce, August 1992, Gaithersburg, MD

- Application Profile for the Government Information Locator Service (GILS), US Department of Commerce, December 1994, Gaithersburg, MD

- Cartographic materials: A manual of interpretation for AACR2, Anglo-American Committee on Cataloguing of Cartographic materials, 1982, Chicago

I thought it was an interesting coincidence that a state with questionable presidential election results would be pummeled by hurricanes just before the next election. Then I thought it was an interesting coincidence that the storms spared Miami, who voted for Gore in 2000. Just out of curiosity, I overlaid two maps: one of the tracks of the hurricanes of 2004, and one of the election results of 2000.

This is no longer an interesting coincidence. It is an unmistakable message from God. I hope everyone is listening.

2000 Presidential Election in Florida by County
Blue — Gore
Pink — Bush

ANY QUESTIONS?

Note: After leaving Florida, Charley hit Georgia and Frances hit Georgia and South Carolina. Both voted for Bush in 2000.

The path of Ivan is projected as of Sept 14. Alabama, Mississippi and Louisiana all voted for Bush. If you have any doubt this message is coming from, watch to see if Ivan veers West to hit those states as well.

© 2004 Bob Morris You are hereby granted permission to freely copy and distribute this picture provided:
1) you do not change anything, 2) this notice remains intact and 3) you do not change anything.
All other rights reserved.
Conditional statements:
- language: documented if not defined by the encoding standard
- characterSet: documented if ISO 10646-1 not used and not defined by the encoding standard
- hierarchyLevel: documented if hierarchyLevel not equal to "dataset"
- hierarchyLevelName: documented if hierarchyLevel not equal to "dataset"
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<th>Short Name</th>
<th>Definition</th>
<th>Obligation/Condition</th>
<th>Maximum occurrence</th>
<th>Data type</th>
<th>Domain</th>
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<td>basic information required to uniquely identify a resource</td>
<td>Use obligation from referencing object</td>
<td>Use maximum occurrence for referencing object</td>
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<td>M</td>
<td>1</td>
<td>Class</td>
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<td>Free text</td>
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<td>1</td>
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<td>Free text</td>
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<td>idCredit</td>
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<td>CharacterString</td>
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<td>O</td>
<td>N</td>
<td>Class</td>
<td>MD_ProgressCode &lt;&lt;CodeList&gt;&gt; (B.6.26)</td>
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</table>
Recommended core metadata for geographic datasets

- Dataset title
- Dataset reference date
- Dataset responsible party
- Geographic location of the dataset (by four coordinates or by geographic identifiers)
- Dataset language
- Dataset character set
- Dataset topic category
  - Spatial Resolution
- Abstract describing the dataset
  - Distribution format
- Additional extent information (vertical and temporal)
- Spatial representation type
- Reference system
- Lineage statement
- On-line resource
- Metadata file identifier
- Metadata standard name
- Metadata standard version
- Metadata language
- Metadata character set
- Metadata point of contact
- Metadata time stamp

✓ Mandatory
ISO 19115:2003

- Designed:
  - to support geographic information;
  - to work with wider information technology standards and practices;
  - to serve the global community, in a multi-national, multi-language environment;
  - based on a foundation of national, regional, and special information community standards and experiences
- Developed through a rigorous, consensus ISO process
- Provides a foundation for national, regional, and global interoperability

Semantic Interoperability
On-going Metadata Work

- ISO 19115-2 *Geographic Information – Metadata – Part 2 Extensions for Imagery and Gridded Data*
ISO 19139
Geographic Information - Metadata
XML Schema Implementation

- Defines spatial metadata XML (smXML) encoding
  - an XML Schema implementation derived from ISO 19115-Geographic information – Metadata

- XML Schema
  - More rigorous validation of compliance
  - More exact representation of UML

- Based on Comprehensive Profile ISO 19115

- Separate from ISO 19115
  - More easily evolve with changes in technology
  - Quickly establish implementation of ISO 19115

Technical Interoperability
Build Process

Isolate ISO 19115 related elements in Harmonized model

ISO 19115 (softcopy from harmonized model .cat)

Apply encoding rules based on 19118 (UML to XML)

XML Schema (smXML)
Checks just structure
And some content

Conformance Rules for a profile – Validator*
Checks all content

Realize basic types, GML, 19103, other

*Validator not supplied in document
Realization of existing XML Schema

In ISO 19115 harmonized UML model from ISO 19107

```
<<Type>>
GM_Object
```

+ mbRegion() : GM_Object
+ representativePoint() : DirectPosition
+ boundary() : GM_Boundary
+ closure() : GM_Complex
+ isSimple() : Boolean
+ isCycle() : Boolean
+ distance(geometry : GM_Object) : Distance
+ dimension(point : DirectPosition = NULL) : Integer
+ coordinateDimension() : Integer
+ maximalComplex() : Set<GM_Complex>
+ transform(newCRS : SC_CRS) : GM_Object
+ envelope() : GM_Envelope
+ centroid() : DirectPosition
+ convexHull() : GM_Object
+ buffer(radius : Distance) : GM_Object

From ISO 19136

```
gml:AbstractGeometryType
```

In harmonized UML model from ISO 19103

```
<<Type>>
Sequence<Character>
```

```
<<Type>>
Character
```

From XML Schema

```
xs:string
```

```
<<Type>>
CharacterString
```

+ size : Integer
+ characterSet : CharacterSetCode = "ISO 10646-2"
+ elements[size] : Character
+ maxLength : Integer

+ isNull() : Boolean
+ ==(s : CharacterString) : Boolean
+ !=(s : CharacterString) : Boolean
+ ==(s : CharacterString) : Boolean
+ >(s : CharacterString) : Boolean
+ ==(s : CharacterString) : Boolean
+ <=(s : CharacterString) : Boolean
+ >(s : CharacterString) : Boolean
+ toUpperCase() : CharacterString
+ toLowerCase() : CharacterString
+ subString(lower : Integer, upper : Integer) : CharacterString
ISO 19139 Specification

- Implementation UML profile process
- Identification of additional 19100 entities
  - 19103, 7, 8, 9, 18
- smXML encoding rules
- Other (19100) encoding rules
  - scXML spatial common XML
  - ssXML spatial schema XML
  - stXML spatial temporal XML
  - asXML application schema XML
- smXML types to enforce domain restrictions
- smXML (XML schema)
- Referenced XML schema
- UML to XML schema process
  - Rational Rose scripts
  - XSLT XML to XSD
- Implementation examples

http://www.isotc211.org/smXML

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="http://www.isotc211.org/smXML"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:smXML="http://www.isotc211.org/smXML"
  xmlns:scXML="http://www.isotc211.org/scXML" version="0.10">
  <!-- ================== Classes  ================== -->
  <xs:complexType name="CI_ResponsibleParty_Type">
    <!-- Classes -->
  </xs:complexType>

  <!-- Other (19100) encoding rules -->
  <xs:simpleType name="EncodingRuleType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="smXML"/>
      <xs:enumeration value="scXML"/>
      <xs:enumeration value="ssXML"/>
      <xs:enumeration value="stXML"/>
      <xs:enumeration value="asXML"/>
    </xs:restriction>
  </xs:simpleType>

  <!-- Referenced XML schema -->
  <xs:schema targetNamespace="http://www.isotc211.org/smXML"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:xlink="http://www.w3.org/1999/xlink"
    xmlns:smXML="http://www.isotc211.org/smXML"
    xmlns:scXML="http://www.isotc211.org/scXML" version="0.10">
    <!-- Classes -->
  </xs:complexType>
</xs:schema>
ISO 19139

Schedule

- Working Draft2: 2003-09
- Working Draft3: 2004-03
- Preliminary Draft TS: 2004-06
- Draft TS: 2005-01
- Technical Specification: 2005-03
ISO 19115-2 Geographic Information – Metadata – Part 2 Extensions for Imagery and Gridded Data

- **Scope**
  - This International Standard extends ISO 19115:2003 Geographic Information – Metadata by defining the schema and additional metadata required for imagery and gridded data
Proposed Extensions
Identification Information

New Imagery Elements and Existing Classes

- Mission_Completion
- Mission_Description
- Mission_Significant_Event
- Mission_Start_Date
- Platform_Information
- Platform_and_Instrument_Identification
- Data_Dictionary_Reference
- Science_Paper
- User's_Guide

MD_Identification
Proposed Extension

Data Quality – Lineage

New Imagery Elements and Existing Classes

Algorithm_Change_History
Algorithm_Identifiers
Algorithm_Peer_Review_Information
Algorithm_Reference
Algorithm_Text_Description

Command_Line_Processing_Parameter
Processing_Change_History
Processing_Documentation
Processing_Identifiers
Processing_Procedure_Description
Processing_Run_History
Processing_Software_Reference

LI_ProcessStep
If(count(source) + count(processStep) = 0) and (DQ_DataQuality.scope.level = 'dataset' or 'series') then statement is mandatory.

"source" role is mandatory if LI_Lineage.statement and "processStep" role are not documented.

"processStep" role is mandatory if LI_Lineage.statement and "source" role are not documented.

"description" is mandatory if "sourceExtent" is not documented.

"sourceExtent" is mandatory if "description" is not documented.

inputDataset is mandatory if inputLevel.exists.

commandLineParameter is mandatory if parameters to control operations are entered at run-time.
<table>
<thead>
<tr>
<th>Name</th>
<th>Short Name</th>
<th>Definition</th>
<th>Obligation</th>
<th>Max Occurrence</th>
<th>Data Type</th>
<th>Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE_Algorithm</td>
<td>Algorithm</td>
<td>details of the methodology by which geographic information was derived from the instrument readings</td>
<td>Use</td>
<td>Use maximum occurrence from referencing object</td>
<td>Aggregated Class (LE_ProcessStep)</td>
<td></td>
</tr>
<tr>
<td>identifier</td>
<td>algId</td>
<td>information identifying the algorithm and version or date</td>
<td>M</td>
<td>1</td>
<td>Class</td>
<td>&lt;&lt;DataType&gt;&gt;CI_Citation</td>
</tr>
<tr>
<td>description</td>
<td>algDesc</td>
<td>information describing the algorithm used to generate the data</td>
<td>M</td>
<td>1</td>
<td>Class</td>
<td>&lt;&lt;Union&gt;&gt;LE_AlgorithmDescription</td>
</tr>
</tbody>
</table>
ISO 19115-2
Schedule

- **Working Draft:** 2003-09
- **Working Draft 2:** 2004-09
- **Committee Draft:** 2005-03
- **Draft International Standard:** 2005-09
- **Final DIS:** 2006-05
- **IS:** 2006-08
Summary
Interoperability, Standards, & Metadata

- Many flavors of interoperability
- Standards – a key factor enabling interoperability
  - Agreement between provider and user
  - Wide acceptance of products and services – quality of life
  - Consensus technical solutions
  - ISO TC 211 – establishing the building blocks - implemented by industry
- Metadata – another key factor enabling interoperability
  - Data about data
  - The right data for the right purpose

- Essential for all aspects of spatial data handling
  - Locate
  - Evaluate
  - Extract
  - Employ

- Metadata in the ISO 19115 standard
  - Semantic interoperability
  - Provides a common understanding
  - Expanded networks
  - Global Interoperability

- ISO TC 211 is taking the next steps
  - Expanding for imagery
  - Implementation specification
    - Technical interoperability

Summary
Thank you

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