Interoperability and the National Spatial Data Infrastructure (NSDI)

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Federal Geographic Data Committee Secretariat
Agenda

- Standards and the NSDI
- Specific role of FGDC
  - Standards WG
  - Participation in other bodies, endorsement of external standards
- Geospatial One-Stop interests
- NSDI as the Enterprise
Standardization context

Defining solutions based on requirements and standard interfaces and content

- encourages market competition
- competition reduces price and stimulates innovation
- enables systems integration of services
- reduces vulnerability of monocultural failure

Define operability and interoperability requirements

- Functions performed
- Formats supported
- External interfaces
- Includes semantic content
Roles of Standardization Organizations

- **ISO** provides general purpose standards and specifications as guidance to implementation.
- **Industry Consortia** provide technical implementation specifications.
- **National/Community groups** define common practices, content, and interaction within and outside the group.
Geospatial Standardization

Software interfaces (Implementation Specifications)

OpenGIS Consortium, W3C

Endorsed practices and specifications

SDI

ISO TC 211
Foundations for implementation. (Abstract standards)

National Standards
Content standards, Authority for data

GSDI
Regional SDI Coordination
Other NSDIs

Other SDIs
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N.B. 1. Full title of projects are prefixed with “Geographic information =”.  
2. See ISO/TC 211 web site for the status of each project.  
3. The Status column gives document type and planned publication date (month/year – 5/3 = May 2003).  
   No date = already published.  
W3C Contributions

- HTML
- HTTP
- PNG
- SOAP/XMLP
- SVG
- URI/URL
- XHTML
- XLink
- XML
- XML Query
- XML Schema
- XPath
- XPointer
- XSL and XSLT
- CSS
- DOM
Web Services

- **OASIS**: Not-for-profit global consortium to drive development, convergence, and adoption of e-business standards

- **WS-I**: open, industry organization chartered to promote Web services interoperability across platforms, operating systems, and programming languages.
OGC Specifications

- Simple Features Access (SQL, CORBA, OLE)
- Catalog Services
- Grid Coverages
- Coordinate Transformation Services
- Web Map Server Interfaces
- Geography Markup Language
- Web Feature Service
- Filter Encoding Specification
- Styled Layer Descriptor
Options for National Standardization

- Data policies and laws
- National profiles of international standards and specifications:
  - Data Content/Exchange Standards
  - Geographic Location Gazetteer
  - Geodetic Reference Systems
  - Feature Type Catalogs
FGDC Standards Working Group

- Develops standards unique to the government’s geospatial interests
- Formal proposal, review, balloting, adjudication process for standards relating to data content and common interest
- FGDC participates in ANSI INCITS national standardization body, OpenGIS Consortium, and W3C
Framework Data Themes

Seven themes with high re-use potential

- Hydrography
- Elevation
- Geodetic Control
- Orthoimagery
- Transportation
- Cadastral
- Governmental Units

Revised OMB Circular A-16 assigns federal lead agency responsibility for over 50 themes
FGDC Framework Standards

- Being convened via ANSI/INCITS-L1
- Define core information content to be exchanged by partners for 11 themes
- Intended to encourage import/export of common packages of geospatial information
- Expressed as UML models
- Include XML/GML representation as Annex
Recognition of external standards

Two levels of **FGDC** recognition:

- **Endorsement** – same status as **FGDC** standard: mandatory for use, in accordance with Federal guidance
- **Recommendation** – the non-federal standard is recognized as a useful standard, but is not deemed to be of such broad applicability that its use should be mandatory.
Geospatial Interoperability Reference Model (GIRM)

- GIRM does not contain standards but lists adopted and candidate standards
- GIRM endorse standards based on use and implementation
Structure of the Reference Model

- **Abstract model**: *theory* -- design principles
- **Implementation**: *practice* -- software recipes
FGDC Privacy/Security Interests

- FGDC Privacy Policy issued 1998


Geospatial One-Stop Project Modules

- Framework data standards
- Maintain existing data inventory
- Data acquisition marketplace (Planned data)
- Bringing quality geospatial Web Services online for multiple uses
- Portal development
GOS Service Needs

- Role-based authentication of users for access to sensitive, commercial, and classified information
- Binding to Web services on-the-fly using existing and emerging standard service types
- Establishment of a standards-based national geospatial service registry for many uses
- Streaming complex geospatial information over the Web, testing compression techniques
- Supporting a ‘marketplace’ of providers and consumers of geospatial data
GOS Needs of a Network

- Burstable bandwidth for peak usage
- Transmission of data and ‘pictures’
- Routing and access based on user roles
- Replicated data and services
- Support for third-party authentication
- Distributed processing on distributed data – federated services model
NSDI: Geospatial Enterprise

- Common data and services interests exist to meet core business area requirements that are related to place.
- Initiative to articulate multi-agency geospatial enterprise architecture (BRM, TRM, DRM) across all levels of government beginning in September.
  - Supports Geospatial One-Stop
  - Formalizes service relationships in NSDI.
Why an NSDI EA?

- Differences in understanding and implementing EA in various agencies
- Encourage communication between geospatial business professionals and IT/CIO offices within agencies
- Improve communication between agencies and departments on available services and data backed by BRM
- Identify opportunities to fortify and share common geospatial services across all levels of government
Cross-Agency Activities

FEA-BRM Sub-Functions

HHS
- Public Health Monitoring
- Consumer Health & Safety

USDA
- Recreational Resource Management & Tourism

DOI
- Natural Resource
- Emission

DOE
- Pollution Prevention & Control
- Energy Research

Consumer Safety

Health

Recreation
Metadata
contains queries/harvests Z39.50
queries for registered resources
register/update

Catalog Services
are derived for each

Service Registry/Catalog

Web Feature Services
managed through

Web Mapping Services

spatial data

Web Coverage Services
requests map from
requests vector GML data from
metaDB

Portal Engine

CAT

MetaDB

requests raster data from

Application Client

1. builds query screens for
2. submits queries/requests to
3. returns search responses

Gazetteer

Thesaurus

OGC makes maps from managed through

managed through

spatial data

spatial data

managed through

CAT

Web Client

interacts with

WFS

WFS

WMS

WMS

WFS

OGC Catalog Service
OGC Web Coverage Service
OGC Web Map Service
OGC Web Feature Service

Symbols

name
Software/Service

imagery
Information

OGC
Interface

UI
Function

now: planned:

WCS

CAT

WMS

WFS

Geospatial Enterprise Services
July 2004

Spatial data

makes maps from

served by

served by

mapped through

mapped through

Enterprise Architecture Approach

- Conduct educational outreach with focus on terminology agreement
- Mine existing agency/department EA and geospatial application descriptions and link geo staff with EA staff
- Lead FGDC member agencies will evaluate and describe their business processes and the data defined in their mission business lines – a justification framework
- Reference models to be built using platform independent models in a Services-Oriented Architecture
- Interoperability experiments will be run
- Service-Level Agreements built on found linkages
Opportunities for partnership

- E-government initiatives including recreation.gov and geodata.gov
- DOI EGIM members
- Group on Earth Observations (GEO) partners
- NASA
- Department of Homeland Security
- Environmental Protection Agency
- USDA
- Key state government agencies
For more information, contact:

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