
# Interoperability and the National Spatial Data Infrastructure (NSDI)

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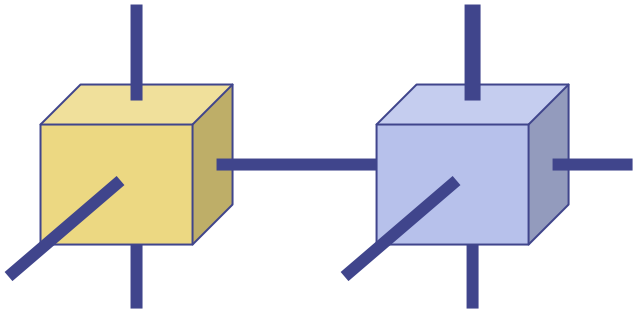
# Agenda

- 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



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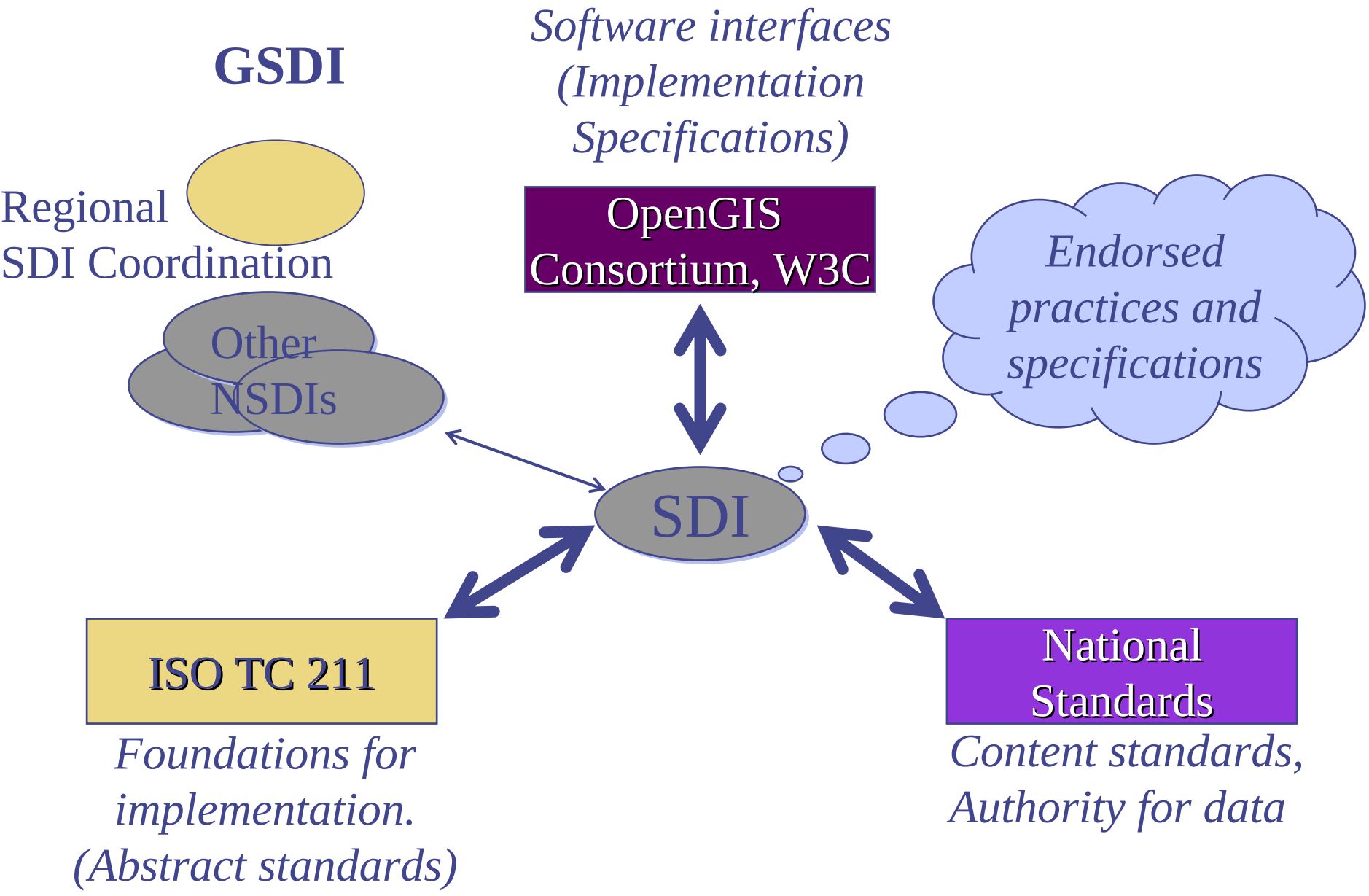
# Roles of Standardization Organizations

- **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



# ISO TC211 Work Items

| Project | Status | Priority | Project | Status | Priority |
|---|---|---|---|---|---|
| **19101 – Reference model** | **IS** | | **19121 – Imagery and gridded data** | **TR** | |
| 19103 – Conceptual schema language | TS 9/2 | | 19122 – Qualifications and certification of personnel | TR 2/3 | |
| 19104 –Terminology | IS 5/3 | | 19123 – Schema for coverage geometry and functions | IS 8/3 | |
| **19105 – Conformance and testing** | **IS** | | **19124 – Imagery and gridded data components** | **RS** | |
| 19106 – Profiles | IS 5/3 | | 19125.1 – Simple feature access: Common architecture | IS 10/2 | |
| 19107 – Spatial schema | IS 11/2 | | 19125.2 – Simple feature access: SQL Option | IS 10/2 | |
| 19108 – Temporal schema | IS 9/2 | | 19125.3 – Simple feature access: COM/OLE option | IS 10/2 | |
| 19109 – Rules for applications schema | IS 12/2 | | 19126 – Profile – FACC Data Dictionary | IS 2/4 | |
| 19110 – Methodology for feature cataloguing | IS 11/2 | | 19127 – Geodetic codes and parameters | TS 4/3 | |
| 19111 – Spatial referencing by coordinates | IS 11/2 | | 19128 – Web Map server interface | IS 10/3 | |
| 19112 – Spatial referencing by geographical identifiers | IS 11/2 | | 19129 – Imagery, gridded and coverage data framework | TS 3/3 | |
| 19113 – Quality principles | IS 10/2 | | 19130 – Sensor and data models for imagery and gridded data | IS 7/4 | |
| 19114 – Quality evaluation procedures | IS 11/2 | | 19131 – Data product specifications | IS 10/4 | |
| 19115 – Metadata | IS 12/2 | | 19132 – Location based services possible standards | RS 11/2 | |
| 19116 – Positioning services | IS 5/3 | | 19133 – Location based services tracking and navigation | IS 10/3 | |
| 19117 – Portrayal | IS 1/3 | | 19134 – Multimodal location based services for routing and navigation | IS 4/4 | |
| 19118 – Encoding | IS 5/3 | | 19135 – Procedures for registration of geographical information items | IS 4/4 | |
| 19119 – Services | IS 12/2 | | 19136 – Geography Markup Language | IS 8/4 | |
| **19120 – Functional standards** | **TR** | | 19137 – Generally used profiles of the spatial schema and of similar important other schemas | IS 11/4 | |

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.
IS – International Standard, TR – Technical Report, TS – Technical specification, RS Review Summary.

# 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

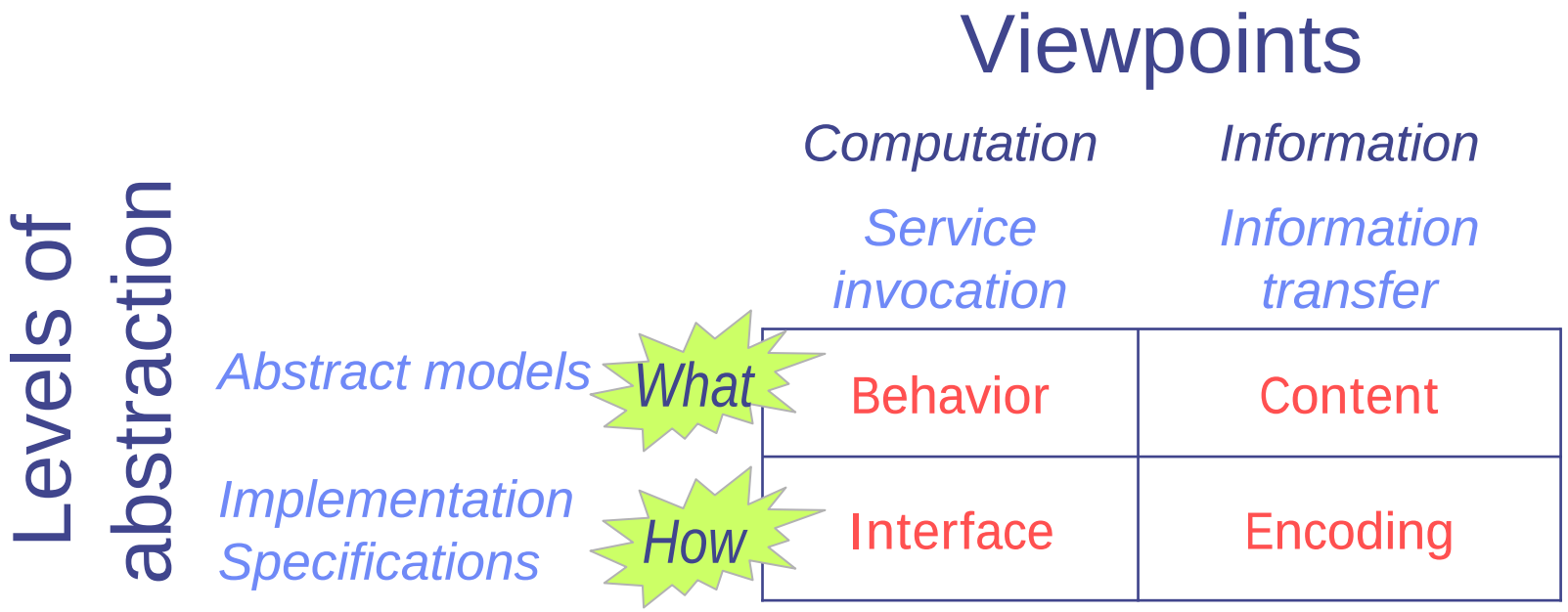
Two levels of **FGDC** recognition:

- 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 published by FGDC Geospatial Applications and Interoperability (GAI) Working Group in 2001
- 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
  http://www.fgdc.gov/fgdc/policies/privacypolicy.pdf
- FGDC Homeland Security WG: "Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns"
- "Mapping the Risks: Assessing the Homeland Security Implications of Publicly Available Geospatial Information" (RAND Report MG-142 NGA 2004)

# 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

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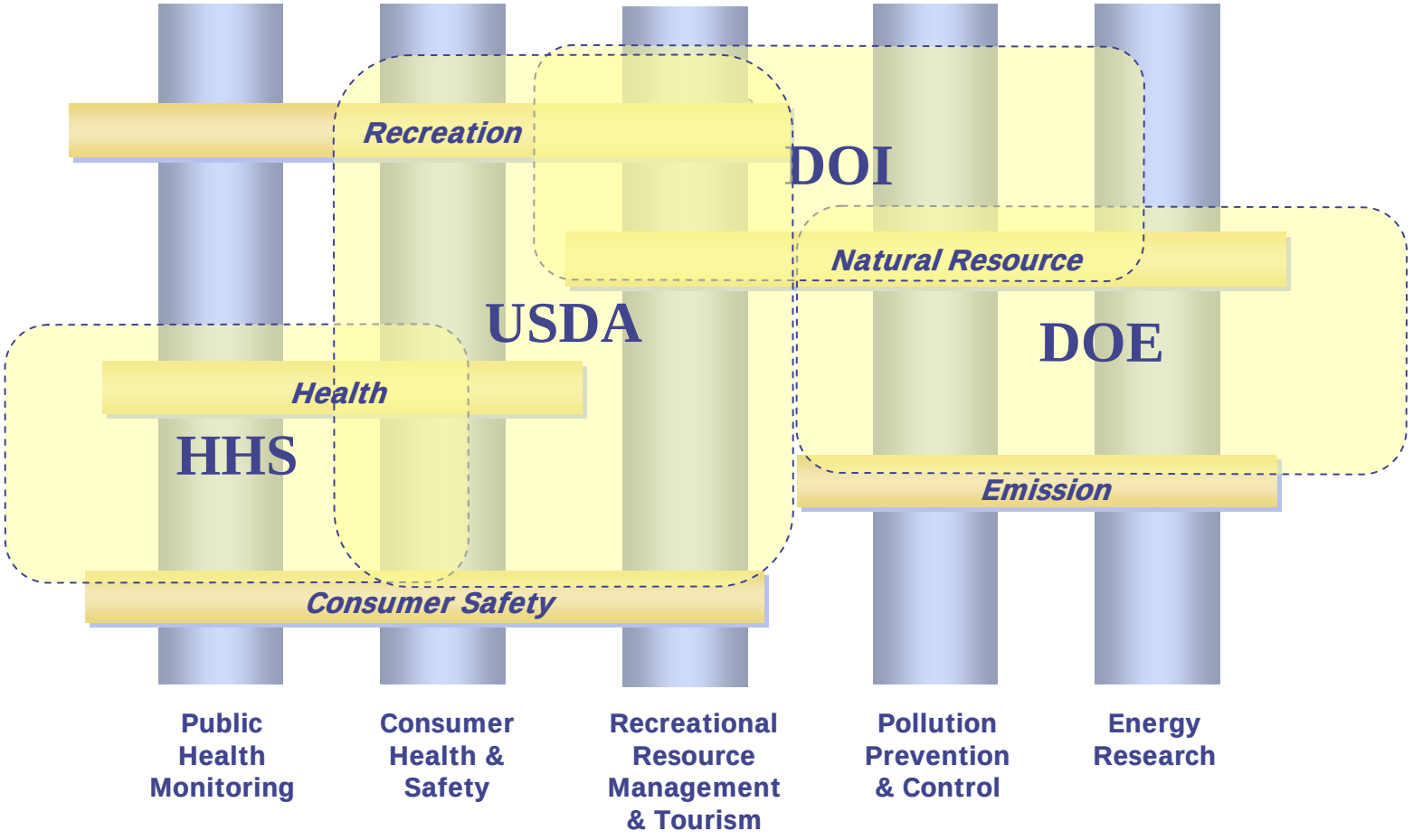
# Why an NSDI EA?

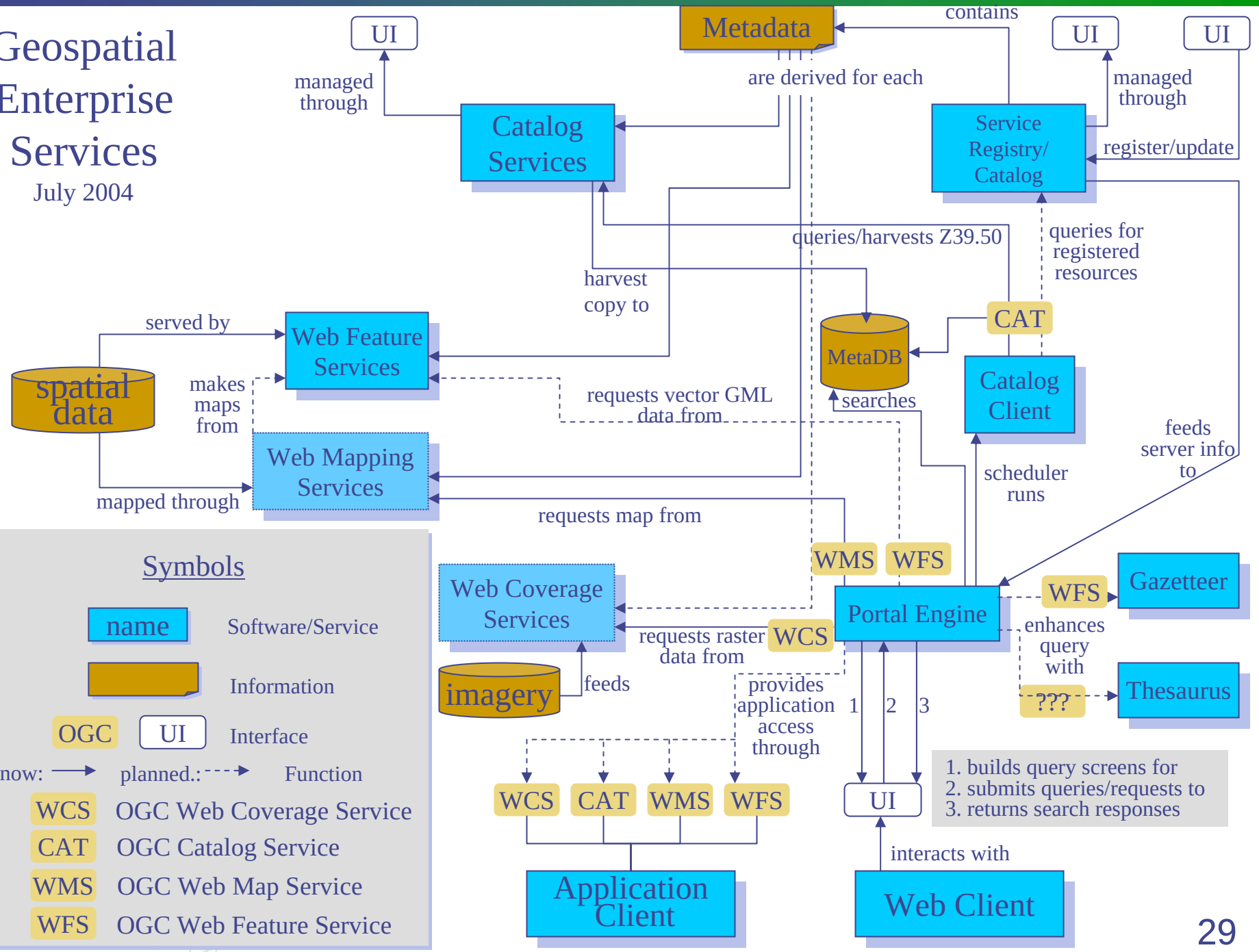
- Differences in understanding and implementing EA in various agencies
- Encourage communication between geospatial business professionals and IT/CIO offices within agencies
- Improve communication between agencies and departments on available services and data backed by BRM
- Identify opportunities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

# Cross-Agency Activities



# Geospatial Enterprise Services

July 2004



# 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

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