Connecting our Coasts

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Coastal and Marine Research Centre
Outline

- Terminology
- ICAN
- Problem
- Approach
- Demo
Interoperability

Make distributed heterogeneous information systems (web services, databases, etc.) communicate
Semantics

Meaning of “information” (data, metadata, etc.): term definitions, semantic relationships, etc.
Coastal Web Atlas (CWA)

Web application for the delivery of coastal resources, including: maps, geospatial data, metadata, thematic information
CWA Semantic Interoperability

Providing seamless access to distributed, and semantically heterogeneous coastal web atlases
International Coastal Atlas Network

ICAN is an informal group of +50 organisations with shared interest in coastal web atlases.

ICAN community has been meeting regularly over the past 7 years to scope and implement data interoperability approaches to coastal web atlases.

http://ican.science.oregonstate.edu
Goals of ICAN

• Ensure network has **wide representation** (developers/users)
• Develop technical & policy **guidelines** for atlas developers
• Highlight benefits of **interoperability & standards** based systems
Goals of ICAN

• Develop **collaborative projects** for sharing know-how, atlas implementation, and demonstration

• Align atlas efforts to facilitate **interoperability**

• Engage with **other relevant projects and developments**

• Involve representatives of the **user communities**
Guidelines for Developers

- Principles of atlas design
- Case studies around the world
- CWA management and governance
Guidelines for developers

- Cookbooks produced as part of the EU FP7 NETMAR project
  - Web Processing Services Cookbook
  - ICAN Semantic Cookbook
  - Semantic Data and Processing Service Cookbook

http://netmar.nersc.no
Problem

- CWA Heterogeneity:
  - Syntactic (data formats, query languages)
  - Structural (data schemas)
  - Semantic (meaning of data values)

Example: Metadata
  - Different metadata standards (ISO-19115 vs. FGDC)
  - Different vocabularies: ‘Seabed’ vs. ‘Seafloor’
    ‘Coastline’ vs. ‘Shoreline’
  French, Spanish, English...
Problem

“Coastline”

“Shoreline”

“Ligne de côte”

Atlas X
Problem
Approaches

Approach 1: Standardisation
Approaches

Approach 2: Mediation (Adaptor)
Standardisation

- Standardise access interfaces and data formats
  - Use W3C standards
  - Implement OGC Web Services
  - Use metadata standards
    - ISO-19115, ISO-19139, ISO-19119, Dublin Core
Mediation

- Mediation
- Mediator
- Wrapper
- Wrapper
- Wrapper
- One database
- Consistent semantics
- Same query language
- Same data model and format
- Heterogeneous data sources

Relational

Object

XML
Standardisation vs. Mediation

ICAN

Mediation

Standardisation

Mediation

Standardisation

Mediation

Standardisation
Mapping Example:
ican:HumanActivity
is broader than
oca:Economy
Semantic Framework

Semantic Web Service (SWS)

- Jena (Java)
- Lucene (Java)

CMRC TDB

- Restructured Concept Schemes + inferences

Index

- Concept Descriptions

ETL

- Concept Schemes

BODC Vocabulary Server – Version 2

Get Concept Schemes
Get Concept Scheme
Get Collections
Get Collection
Get Concepts
Get Concept
Search Concept
Get Related Concepts
Build Concept Hierarchy
Interpret Concept

SWS Specification submitted to GEOSS best practices wiki
CSW Mediation Architecture

CSW Mediator (CSWM)

Semantic Web Service (SWS)

CSW 2.0.2 Request or CSWM Request

CSW 2.0.2 Response or CSWM Response

CSW 2.0.1

CSW 2.0.2

CSWM
CSW Mediation Work Flow

(1) Search datasets for:
  - Keyword: k,
  - Geographic area: g,
  - etc.

(2) \( R = \text{GetRecords}(k, g, \ldots) \)

(3) \( \text{InterpretConcept}(k) \)

(4) \( \text{InterpretConcept Response} \)

(5) \( R_i = \text{rewrite}(R) \)

(6) \( \text{GetRecords}(R) \)

(7) \( \text{GetRecords Response} \)

(8) Merge responses and rewrite record IDs

(9) \( \text{GetRecords Response} \)

Catalogue Service \( CS_1 \) ... Catalogue Service \( CS_i \) ... Catalogue Service \( CS_n \)

Semantic Web Service (SWS)
Demo

HTTP://ICAN2.UCC.IE/ATLAS
Habitat Alteration

http://vocab.nerc.ac.uk/collection/A01/current/Habitat_Alteration/

Processes, activities and events that change the nature of the environment provided for living organisms.

Related Terms

- **MIDA Themes**
  - Bathing Water Quality
  - Coastal Lagoons
  - Coastal Stability
  - Coastal Typology
  - Dune Grading
  - Dune Restoration
  - Oil Spill
  - Saltmarshes

- **OCA Themes**
  - Shoreline Accretion, Shoaling and Emergence
  - Shoreline Erosion, Flooding and Submergence

- **Human Responses to Coastal Change**
Geographic Area of Interest

Draw a bounding box in the map area or select a geographic area from the hierarchy below.

- Arctic Ocean
  - Northeast Atlantic Ocean (40W)
    - Bay of Biscay
  - Bristol Channel
- Celtic Sea
  - English Channel
  - Gulf of Guinea
  - Inner Seas off the West Coast of Scotian
  - Irish Sea
  - North Sea
    - Skagerrak
    - St. Magnus Bay
Weather Stations
Abstract: Weather stations in the Republic of Ireland managed by Met Éireann. It includes stations currently...

National Bedrock Geology Map
Abstract: The national bedrock geology map at 1:500,000 scale, providing useful data to Local Authorities....

Stable Lights
Abstract: The locations of stable light sources, (mainly built-up areas) have been determined from the...

Coastal Lagoons
Abstract: The dataset displays the location of 103 lagoons in Ireland and provides information on their type,...

Salt Marshes
Abstract: Comprehensive inventory of salt marshes for the island of Ireland.

Coastal Land Cover Change
Abstract: This dataset from the La Coast project, coordinated by the Joint Research Centre of the European...

GEBCO Bathymetric Contours
Abstract: An extract of bathymetric contours from GEBCO Digital Atlas (published by the British Oceanographic...
National Bedrock Geology Map

The national bedrock geology map at 1:500,000 scale, providing useful data to Local Authorities, Environmental and Geological Consultants, Engineering Contractors, Universities, Exploration Companies and the general public.

Identifier: c0910b0b-65a4-4e76-a863-99bb72826a61

Publication Date: 2004-12-07T15:02:00

Status: Ongoing

Descriptive Keywords:
- Bedrock
- Ireland

Geographic Bounding Box:
North: 55.433513
Thanks

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