An Introduction to MERIDIAN and the MERIDIAN Discovery Platform
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Webinar Overview

- An introduction to MERIDIAN
- MERIDIAN Projects and Initiatives
- The MERIDIAN Metadata Submission and Search tool (“Discovery Portal”)
    - High level overview:
        - purpose
        - metadata profile
        - architecture
    - Demonstration
    - Platform reuse
- Planned works

MERIDIAN

- MERIDIAN: Marine Environmental Research Infrastructure for Data Integration and Application Network
- MERIDIAN is a CFI and provincially funded multi-institutional consortium of highly skilled members of the Canadian ocean acoustic research and computer science communities.
- MERIDIAN projects provide data analytics, management, and visualization tools, as well as resources and expertise to ocean scientists to support their research.

MERIDIAN - Our support

MERIDIAN receives support for operations from a variety of organizations, and has partnered with several research institutions in the pursuit of improved utilization of Ocean data.

Funders

Partners

MERIDIAN - Who we are

Our MERIDIAN team is Pan-Canadian, with members currently across several participant institutions:

- Dalhousie University
- Université du Québec à Rimouski
- Simon Fraser University
- University of British Columbia
- University of Victoria

MERIDIAN - What we do

We work hard to:

- Increase data's value by
  - describing it
  - making it discoverable
  - and reusable
- Create open-source software solutions for
  - data analysis
  - modeling
  - visualization

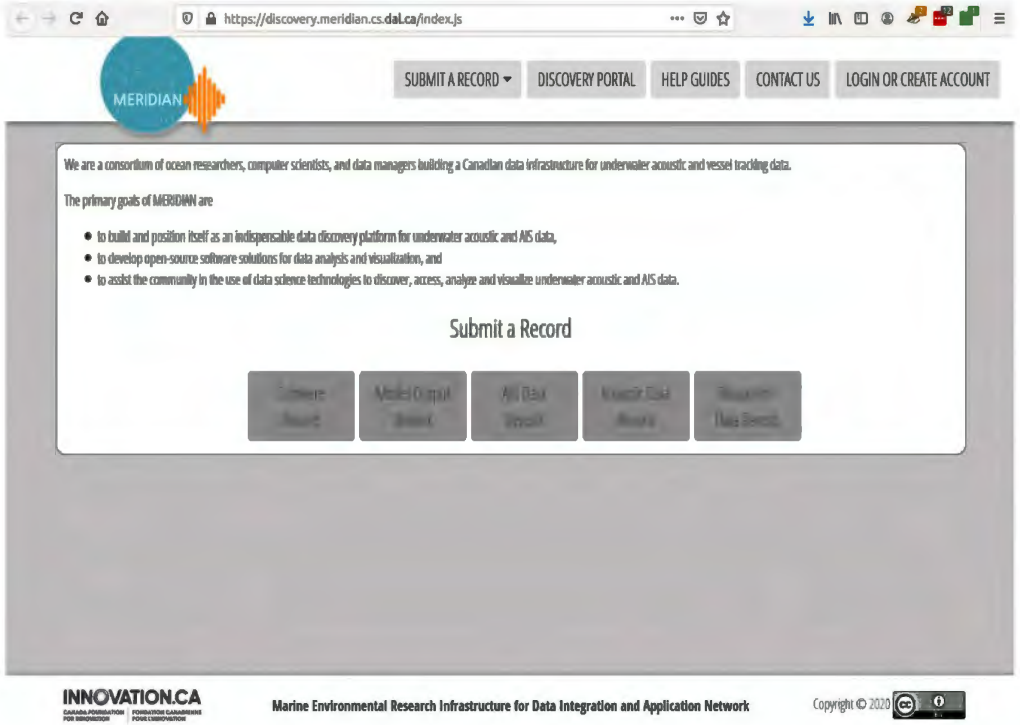
However, we:

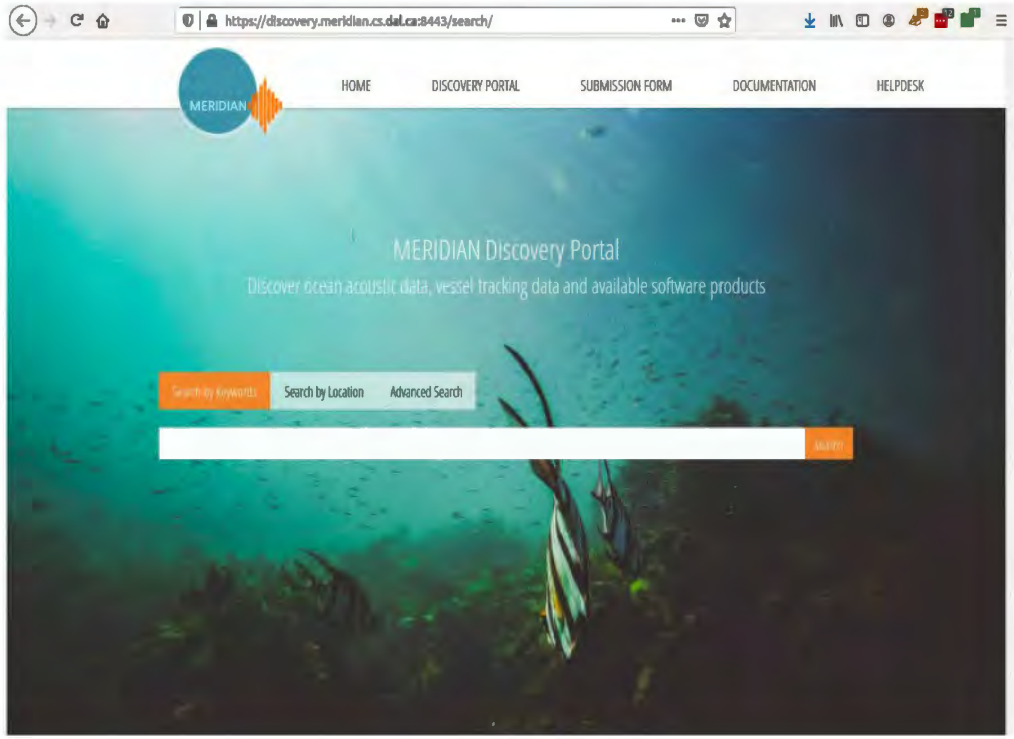
- do not collect data
- are not a data store

MERIDIAN Initiatives

- Ocean Soundscape Atlas (http://soundscape-atlas.uqar.ca/)
- Kadlu: Underwater environmental noise modeling (https://docs.meridian.cs.dal.ca/kadlu/)
- Ketos: A toolkit for underwater acoustic detection and classification with deep neural networks (https://docs.meridian.cs.dal.ca/ketos/)
    - GUI interface in development (Kedgi)
- AIS data collaborations (exactEarth Ltd., Dal, UVic, DFO)
- Education and outreach:
    - Marine Mammal Quiz application (https://data.meridian.cs.dal.ca/mmquiz/)
    - Group Decision Making Support Tool
    - Workshops on topics ranging from machine learning model development to data management

MERIDIAN Metadata Submission and Discovery Portal





MERIDIAN Metadata Submission and Discovery Portal

The metadata submission and discovery portal has been developed in response to an identified gap

- A large volume of underwater acoustic data were known to exist (potentially underutilized)
- This type of data were (and are) becoming increasingly in demand, both:
  - in response to international considerations on the impacts of anthropogenic noise in the Ocean and;
  - as candidates for machine learning approaches, seeking to increase the amount of information that can be extracted from such data

A metadata submission / search tool was perceived a reasonable mechanism to apply FAIR principles to these resources, and a potentially valuable research data infrastructure asset

Targets: Passive acoustic data, acoustic model data and ancillary resources (software, detection information, etc.)

MERIDIAN Metadata Profile

To facilitate description of all “in-scope” resources for this MERIDIAN initiative, a metadata profile was created

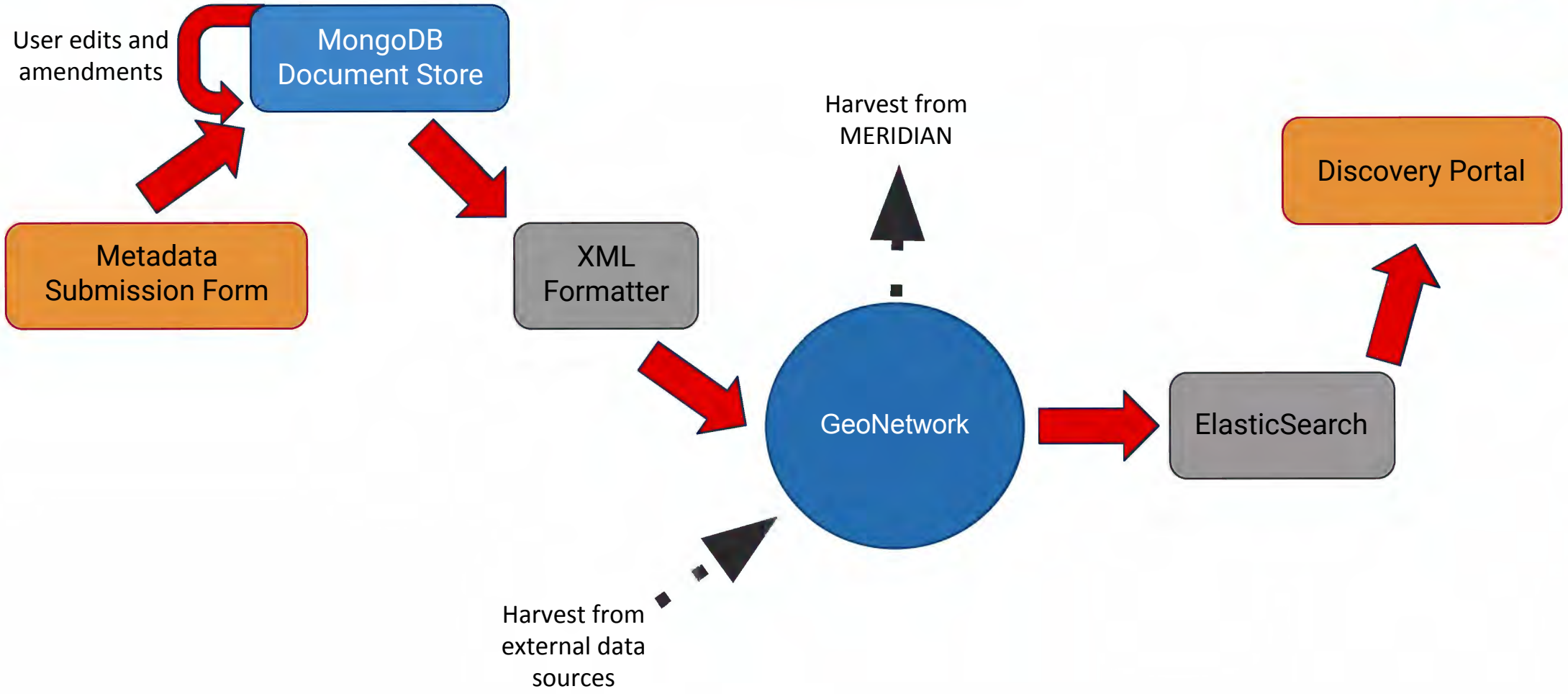
- Underwater acoustic data
  - Based on ISO 19115-2:2009 standard
  - Interoperable with other profiles based on ISO 19115, e.g. US IOOS and CIOOS
  - Incorporates Darwin Core metadata standard for biological information
- Acoustic (among other) ocean data model outputs
- Related software for treatment of this data, and development of models
- AIS (Automatic Identification System) data, in recognition of acoustic vessel detection work

MERIDIAN Metadata Profile (https://docs.meridian.cs.dal.ca/metadata/)

MERIDIAN Metadata Submission and Discovery Portal - Functional Goals

- To permit users to record metadata about their ocean acoustic resources; improving their reusability by making them discoverable
- To offer a concise metadata schema, well suited to these resources, and a simple means of completing records to catalogue them
- To offer researchers a means of locating these newly available resources
    - Furthered by ongoing work with other metadata-gathering institutions to establish metadata sharing; to improve findability of records across institutions (via harvest, for e.g.)

MERIDIAN Metadata Submission and Discovery Portal Framework



Demonstration

https://discovery.meridian.cs.dal.ca

MERIDIAN Metadata Submission and Discovery Portal Code Reuse

- The metadata profile is fully documented and openly available:
  - https://docs.meridian.cs.dal.ca/metadata/
- The interface and backend code are also open-source to lower barriers to development for similar initiatives (to run a modified clone of the portal; release later this week)
  - The underlying architecture which the Portal is built upon is also open-source software

MERIDIAN Future Plans

- Metadata Portal:
  - Review and enhancement of search components as the platform is further adopted and populated
  - Exploration of metadata harvest options:
    - Providing a suitable harvest endpoint for others to access our records
    - Locating relevant repositories to ingest alongside our content
- MERIDIAN general:
  - Online workshop (series) on Big Data Management (tentatively ~June)
  - Development of additional detectors and graphical interface for Ketos platform
  - Exploring feasibility of the establishment of an acoustic “benchmark” dataset for machine learning (e.g. “ImageNet” analogue for acoustics)

Thanks for your time!

http://discovery.meridian.cs.dal.ca
http://discovery.meridian.cs.dal.ca/search

http://meridian.cs.dal.ca