Optimizing Data Discovery and preservation: A FAIR-Compliant Metadata Management System

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History of Institute of Marine Research (IMR) and Ocean Data Management

1900: Establish the Institute of Marine Research (IMR)

Conduct research on marine resource, marine environment and coastal zone and aquaculture as a center of oceanographic resarch in Norway

1902: Establish the International Council for Exploration of the Sea (ICES)

Coordinare and plan the work of oceanographic data collection with an interest in understanding the fluctuation of fisheries of the northeast Atlantic

1961: Establish the International Oceanographic Data and Information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC) of UNESCO

Encourage the international exchange of oceanographic data and to support capacity transfer from developed to less-developed nations

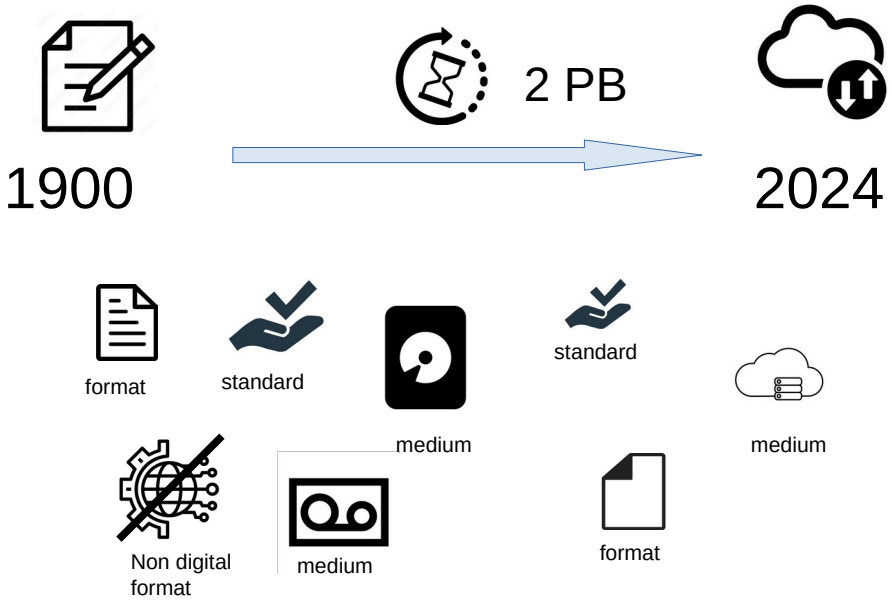
1971: Establish Norwegian Marine Data Center (NMD) under IMR and be a IODE National Oceanographic Center (NODC)

Responsible for long-term preservation of all data collected and generate by IMR

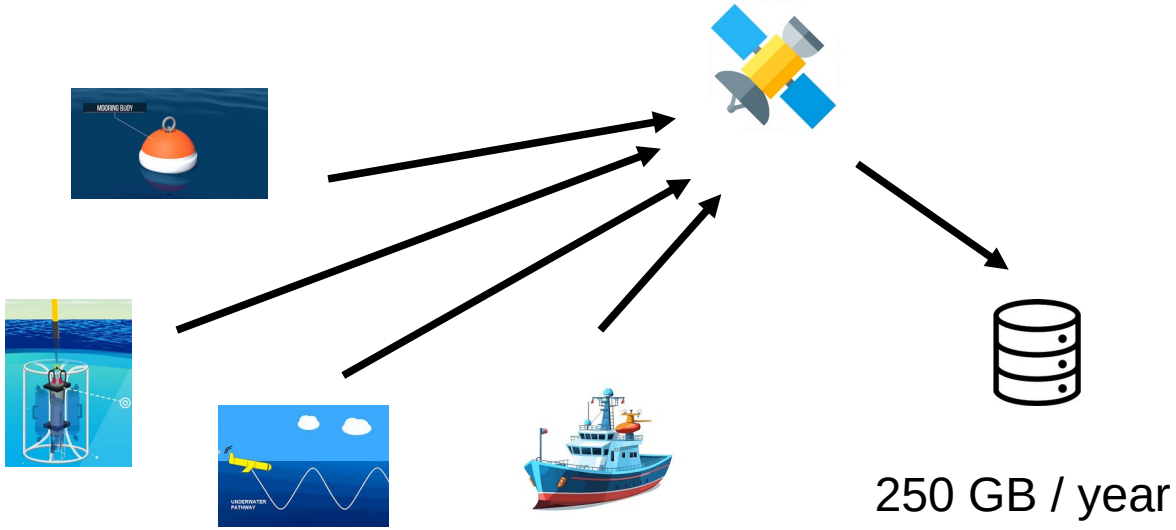
2017: NMD receives the first CoreTrustSeal certification

Marine Data in Norwegian waters

Historical Data



Near Real Time Data



The adoption of standards for metadata collection is necessary for the succeeding in rescue and preservation initiatives

Hills D., 2015

Digital Transformation for IMR

Increase the efficiency, variety and quality of products and services that generate value to our stakeholders

from a FAIR perspective,
metadata are more important than data, because metadata would always be openly available, and they link research data and publications on the Internet of FAIR Data and Services

By Danish National Forum for Research Data Management

NMD’s Metadata Rescue Program (MRP)

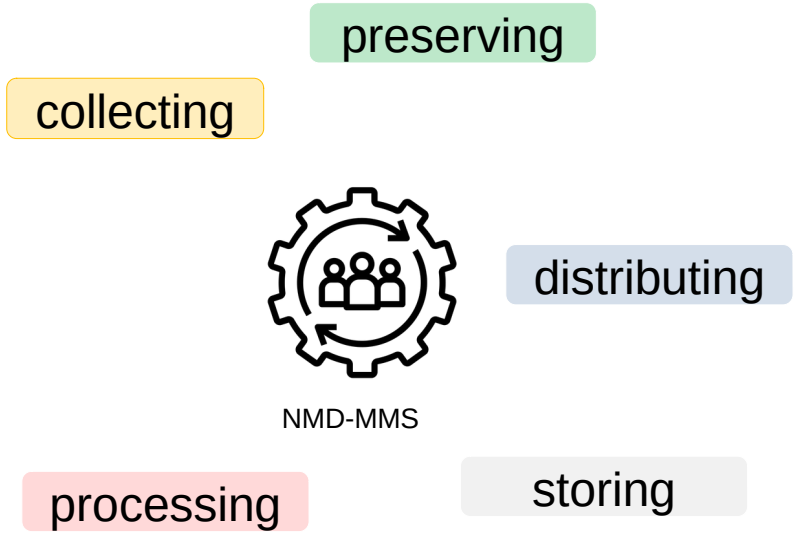
A substantial volume of data in diverse formats, standards, and media has been accumulated since 1900

Develop mechanisms to migrate the historical metadata into a standardized format and digital infrastructure that ensures all generated data is searchable

1. Retrieve metadata from non-reusable and inconsistent formats
2. Convert it to community-agreed standards, such as ISO 19115/19139

NMD Metadata Management System (NMD-MMS)

collecting, processing, storing, preserving and distributing metadata



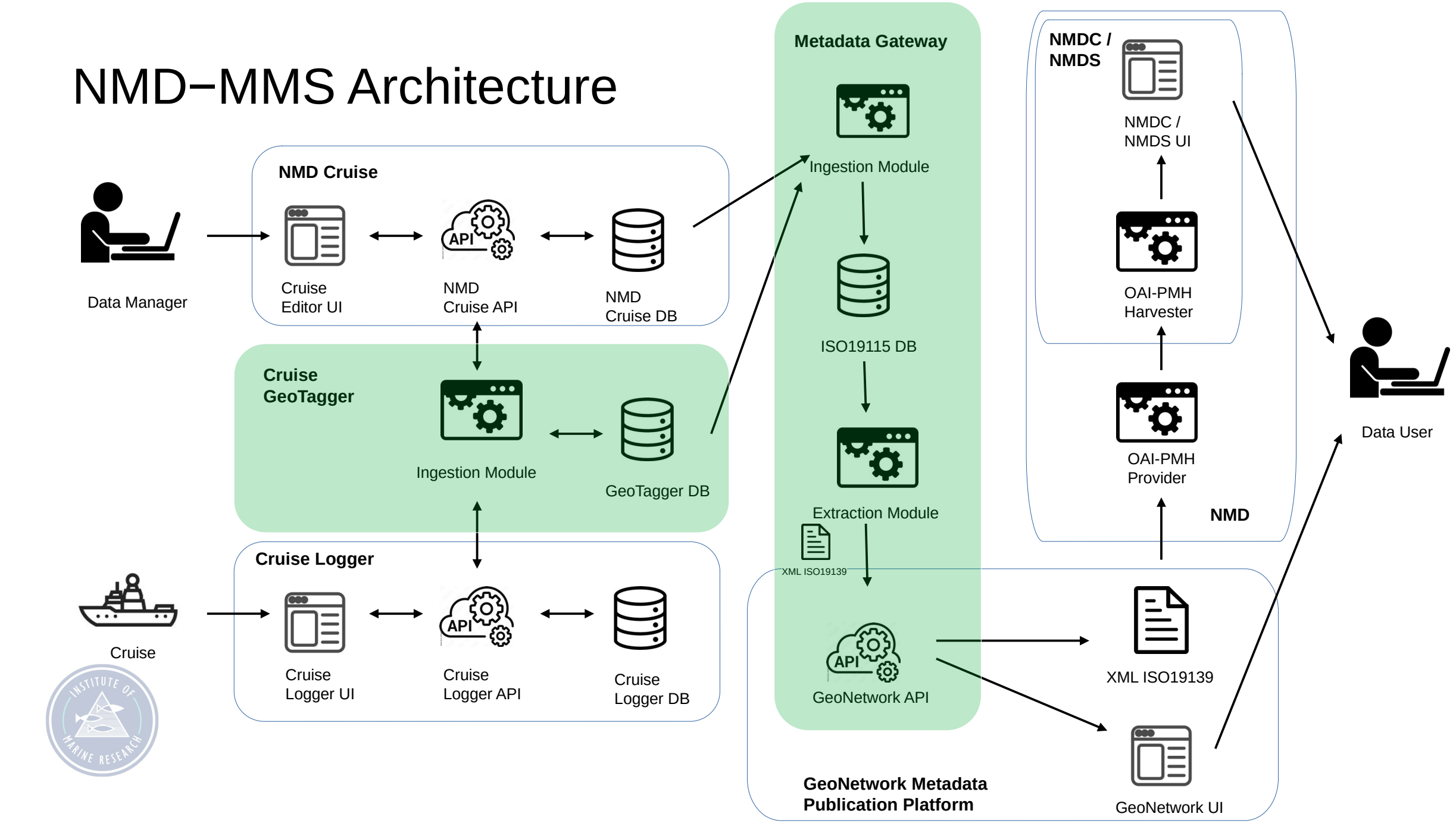
1) Assuring the coupling of the different subsystems that provide metadata to maintain consistency in the content between the subsystems

2) Allowing asynchronous processing and reducing dependencies between subsystems

3) Leveraging on existing open-source infrastructure

4) Complying with community-adopted best practices and standards

NMD−MMS Architecture



Cruise GeoTagger

Themantic key words

- Global change master directory science keywords v6
- SDN Cruise sammary report data categories
- SDN device categories
- SDN parameter disciplines

Geoarea key words

- FAO recognized EEZs with land unions
- Large Marine Ecosystems of the World

Metadata Gateway

- Cruise Plan + Cruise logger data
- Reformat data to ISO19115-3:2023
- Translate into multiple languages (184 supported)
  - English
  - Norwegian
  - French
  - Arabic
  - Spanish
  - Portuguese

Future work

- NMD-MMS is a cornerstone to improve both the way it publishes NRT data and historical data complying with the FAIR principles, and the way it links up with external data systems
  - Text mining and machine learning will support the future process of automated curation of metadata content

- NMD-MMS will also become a key component for collecting and distributing the metadata of the future Norwegian Marine Data Space (NMDS) towards the global digital ecosystem provided by the Ocean Data and Information System - Ocean InfoHub (ODIS-OIH)

- NMD-MMS will support capacity development in metadata management with partner National Oceanographic Data Centers (NODCs) and Associate Data Units (ADUs) from the International Oceanographic Data and Information Exchange (IODE) Network