



# iMarDIS Integrated Marine Data and Information System



## Data Driven Blue Growth Meeting Ocean Renewable Energy Sector Needs with iMarDIS

Graham Worley, **David Mills**, Thomas Prebble, Cathy  
Blakey, Gwyn Roberts & Colin Jago



d.mills@bangor.ac.uk



School of Ocean Sciences &  
Centre for Applied Marine  
Sciences  
Bangor



School of  
Environment  
and Society  
Swansea

SEACAMS1: £25 million over 5 years to increase economic activity in the **MARINE SECTOR:**

- through increased investment in commercially-driven R & D
- by maximising economic impact of academia & business
- by promoting benefits of innovation & science

SEACAMS2: £18 million over 3 years to increase economic activity in the  
**MARINE RENEWABLE ENERGY SECTOR**

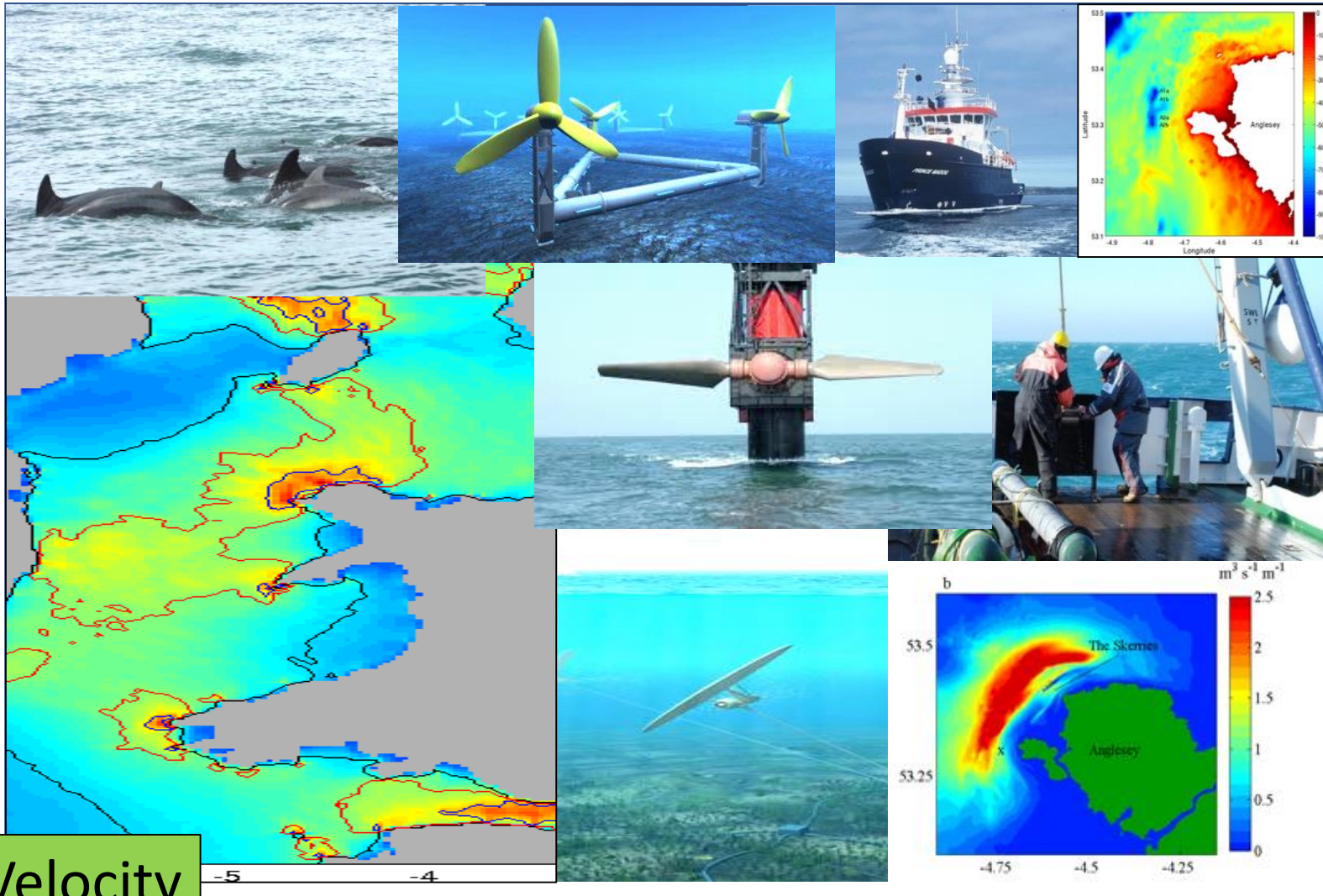
**Funded through EU ERDF Convergence**



**SEACAMS**

# Collaborative Research

## Ocean renewable energy



Velocity



UAV



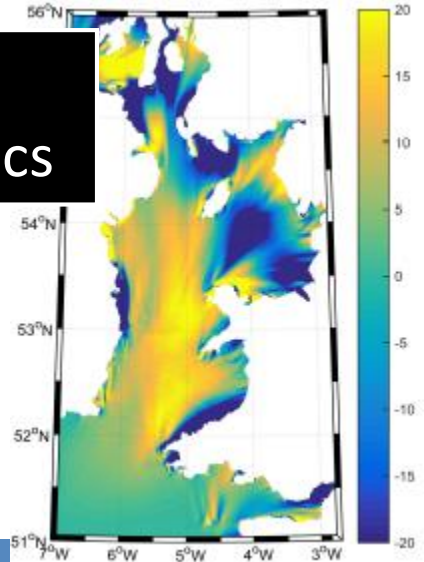
# Data Intensive Science



Remote sensing

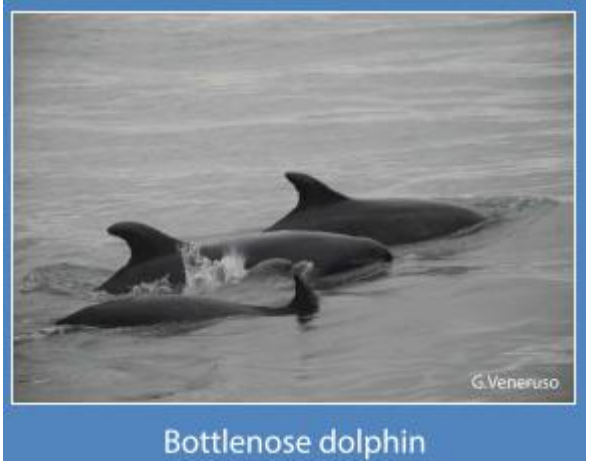


Modelling hydrodynamics

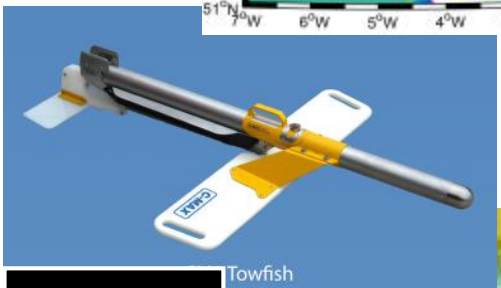


Moored Acoustic Array

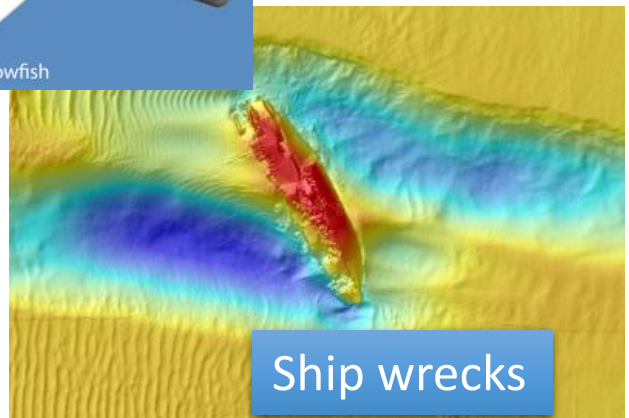
Hydrophones  
Motion sensors



Bottlenose dolphin

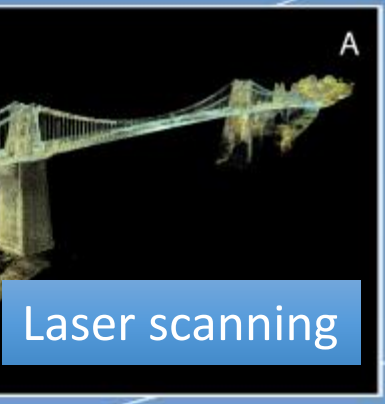
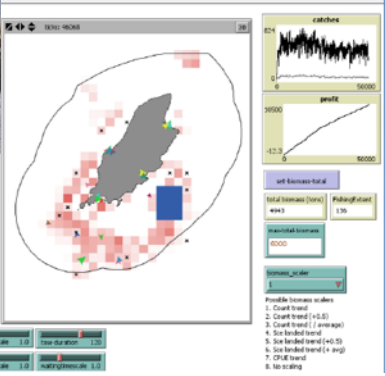
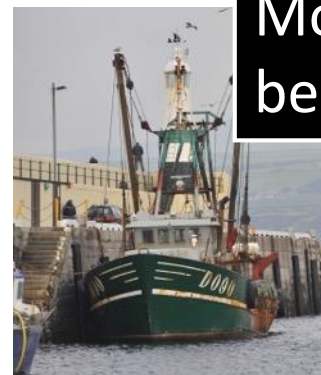


Sonar



Ship wrecks

Modelling fishers behaviour



Laser scanning

# iMarDIS - Integrated Marine Data and Information System

Intertidal  
Spatial offshore survey  
Moorings

## Data

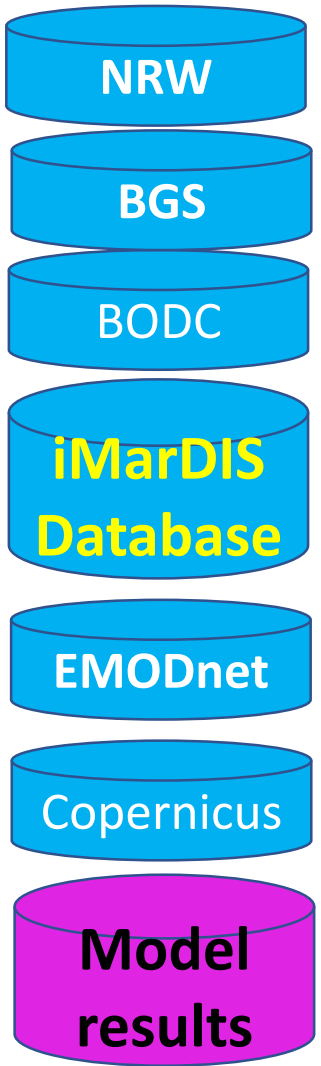


## Data transmission



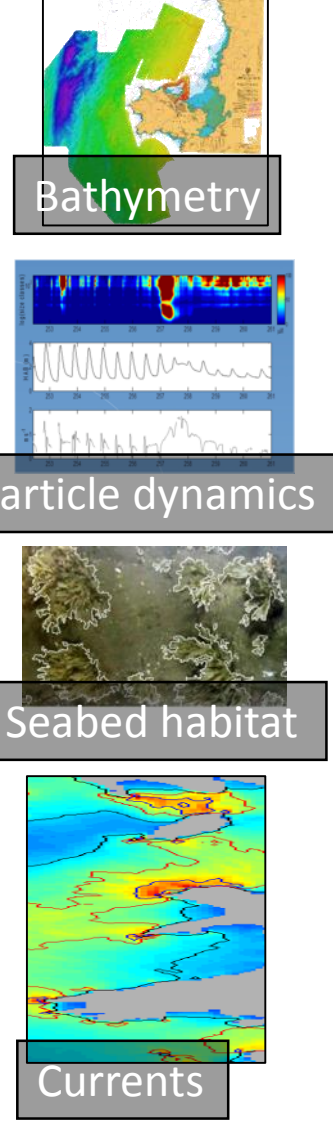
Data upload interface

## Data storage



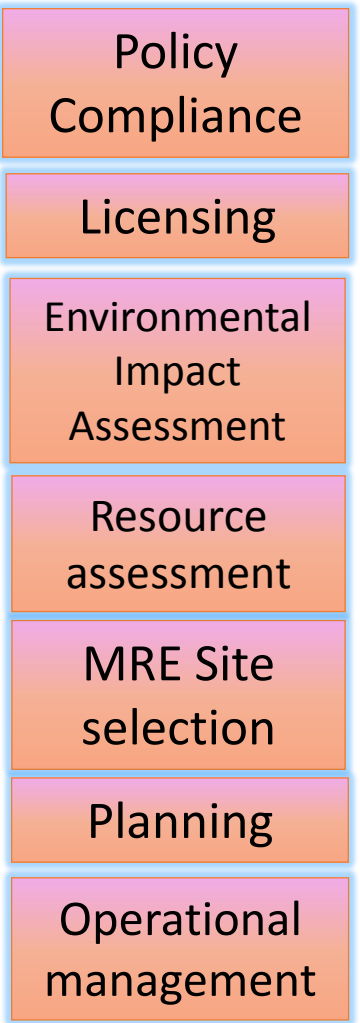
Analytics and visualisation

## Information



User Query

## Application



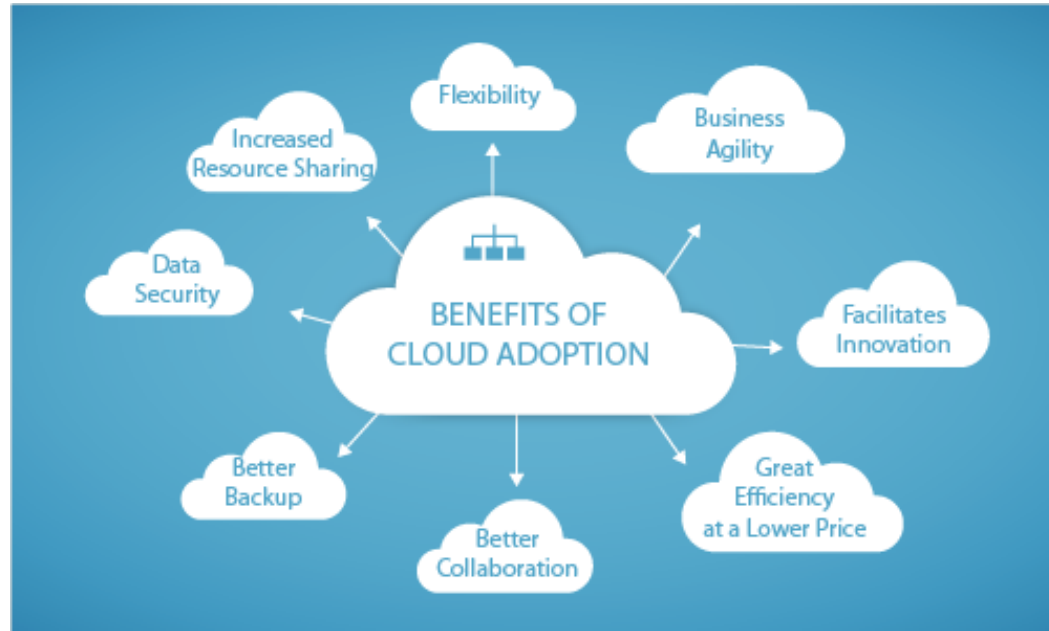
## Decision

Decision taker



**ACTION**

# iMarDIS – A Cloud based Solution



- Zero upfront costs
- 15% reduction in IT spending
- 18% increase in process efficiency
- 20% Increase in time to market

*Source: Vanson bourne 'Business Impact of the Cloud'*



**LINUX**



**PostGIS**

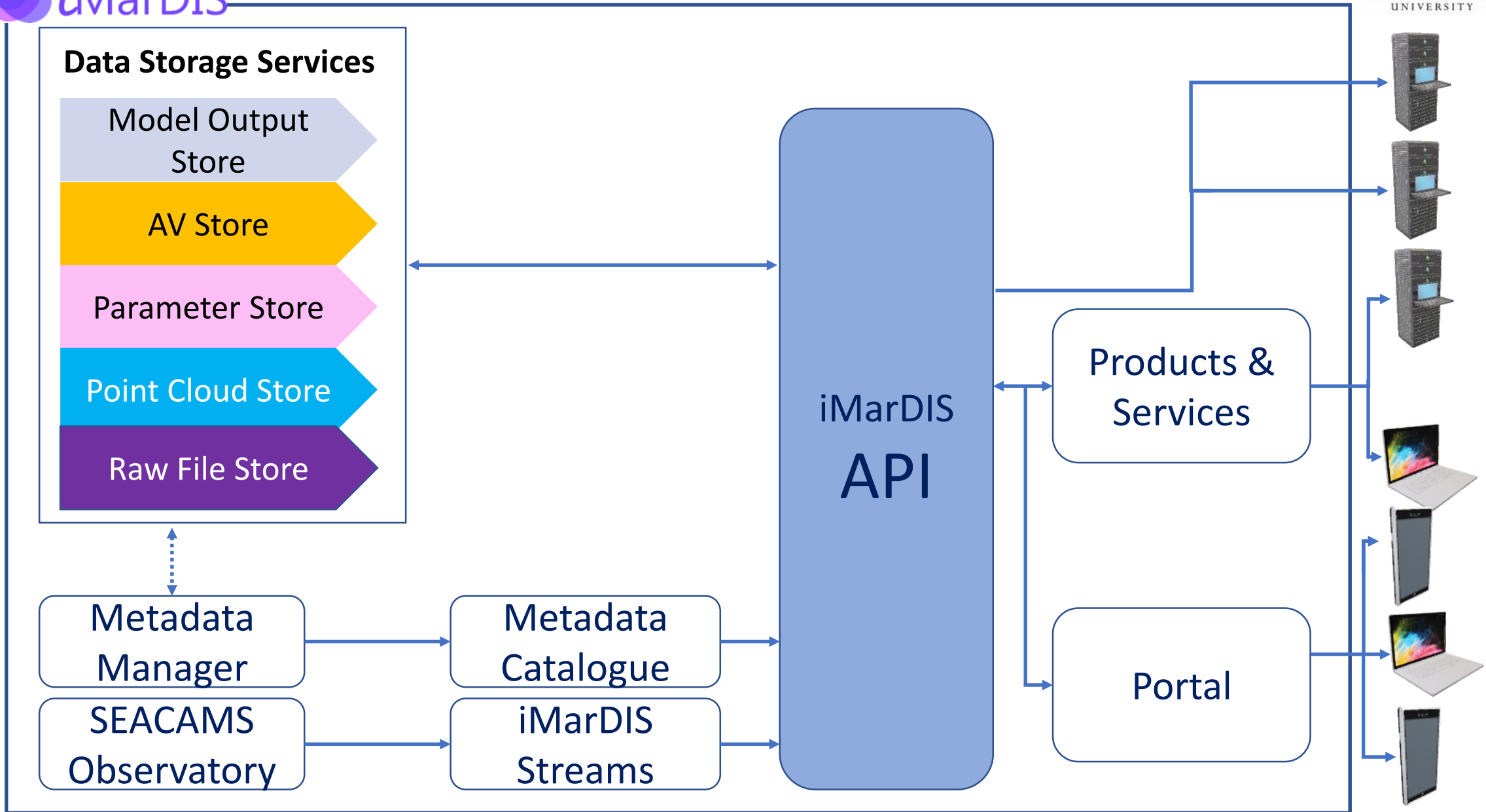


**elasticsearch**

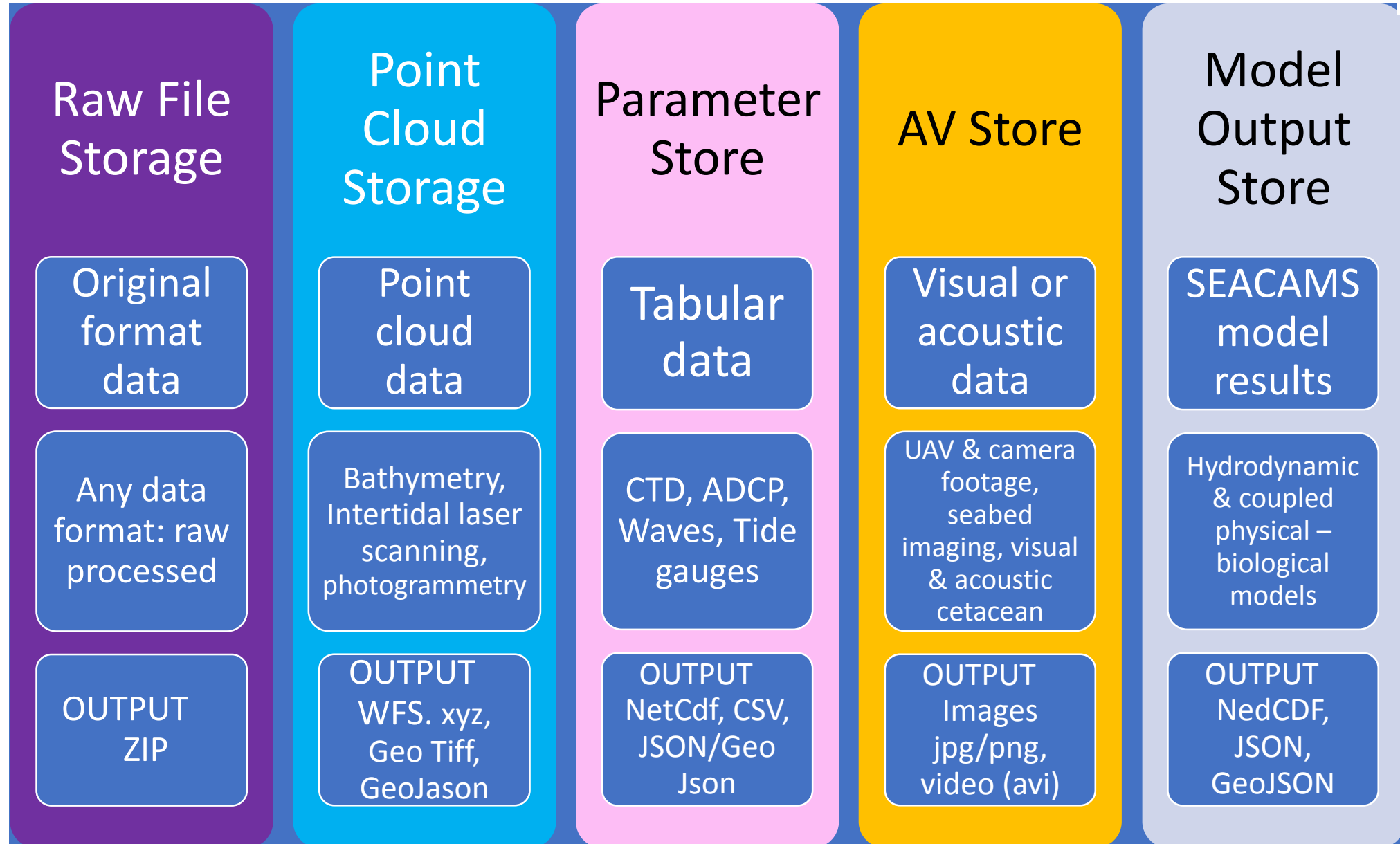
# Rationale for iMarDIS Architecture

- End user driven
- Adopt existing UK standards (MEDIN)
- Interface with European data infrastructures
- Avoid replication of existing capability
- Capable of ingesting and disseminating in real-time very high-resolution data
- Streamline workflow – data collection to curation and re-use

# Overview of systems architecture

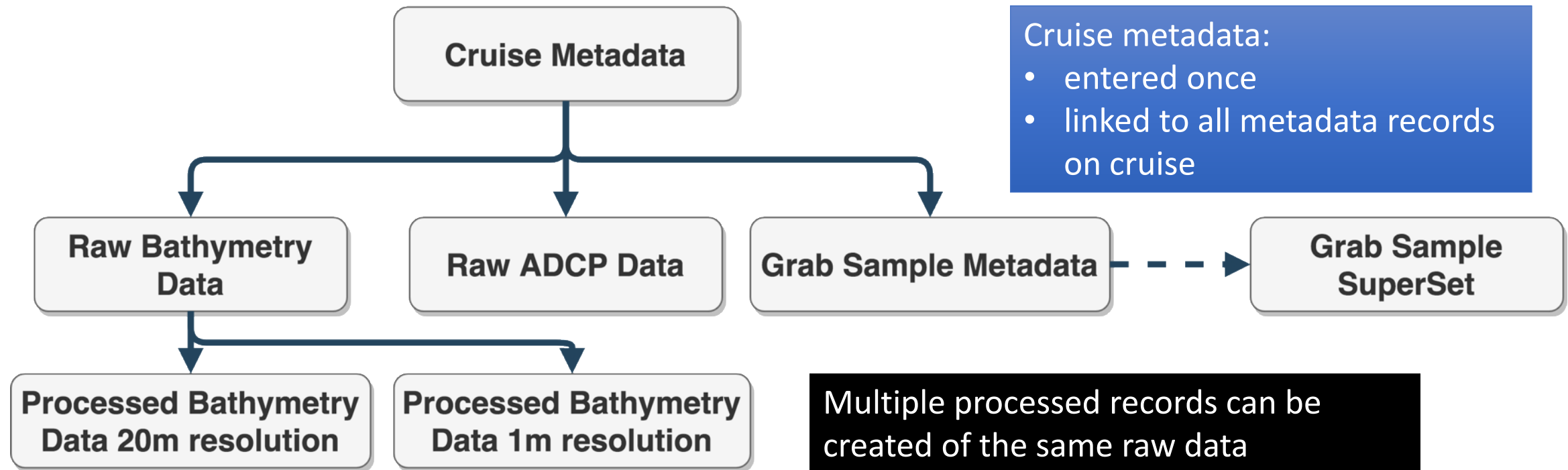






# Metadata Structure

- MEDIN Compliant
- Hierarchical – simplifies metadata entry
- Metadata records extended through child records
- Reduce repetition of metadata entry
- Records can be part of a larger record set



- Simple metadata creation
  - Targeted templates
  - Small metadata records
  - Auto-extract metadata
- Ingest data
  - Over 14 Terabytes ingested
  - Largest file over 380Gb
- Publish metadata
  - Multiple searchable catalogues
- Link data (storage services) to metadata records

**Filename: 20130708 Milford Haven [Neyland] 1m UTM ODN.xyz**

Coordinate Reference System


Number of Points

Resolution(m)

Min Extent  Max Extent

**Extracted Geometry**

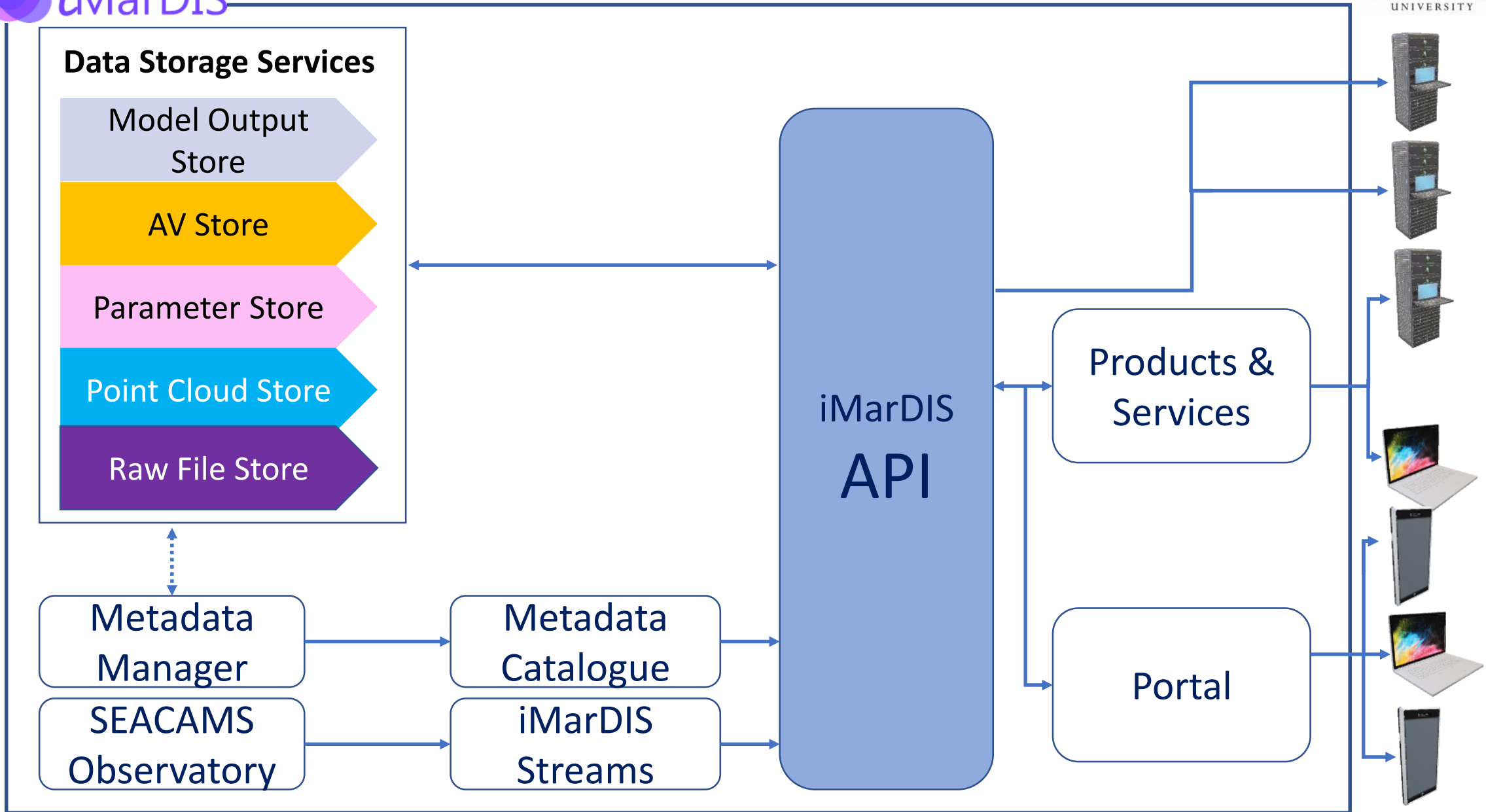
Simplified Polygon (< 150 coordinates)



Use Extracted Spatial Data

Example of geometry metadata extracted from bathymetry file

# Overview of systems architecture



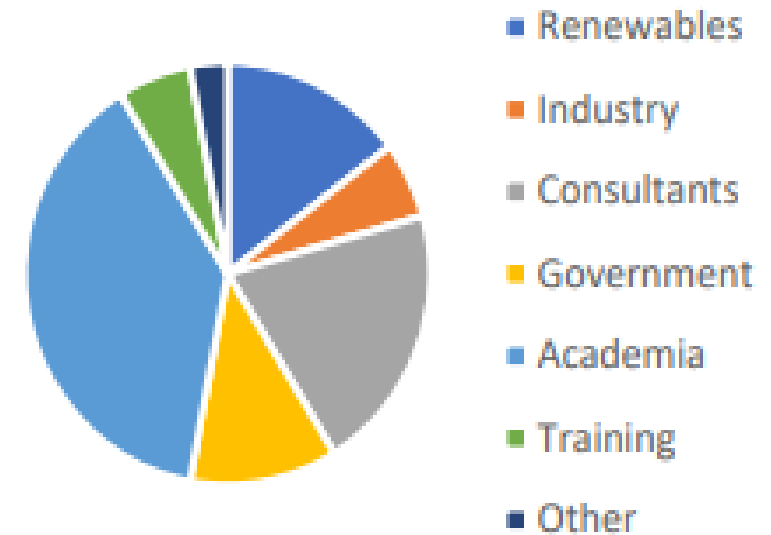
# User needs assessment

## iMarDIS Stakeholder workshop

- Programmatic access to iMarDIS
- Dashboard for model result analysis
- One stop shop
  - Catalogue of WMS/WFS servers
- WMS/WFS servers with simple filtering capabilities
- Semantic Searching
- Virtual Research Environments



## Delegates by sector



## iMarDIS Current status

- Key back-end services completed
- Metadata schema developed (based on MEDIN)
- Metadata manager developed and already in use
- Cataloguing of data and upload of data to servers (>14Tb ingested)

## iMarDIS Next steps

- Web front end – main presentation layer
- Development of access libraries to support Matlab, R etc
- Document and publish API's
- Data discovery
  - continue uploading and cataloguing
  - Publish MEDIN metadata
  - Build products and services utilising iMarDIS API

Thanks for listening



**Marine Centre Wales**