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INSPIRE in Practice:

Standards Based Approaches for Cross-Domain Data Integration

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Issues to be addressed

- The INSPIRE need for cross domain data integration

Modelling principles

- Using best practice
- INSPIRE Data Product Guidelines (D2.6)

Common Patterns

- Identity Carrier Pattern
- Observations and measurements pattern

Building up from the
ISO19100's

For each of the data themes in Annex I II and III you shall have:

- Discovery Service
- View service
- Download Service

Common services across 30 data types

- Ocean Geographical Features, Sea Regions, Meteorological Geographical Features Natural risk zones, Hydrography
- Question to address is *“at what level of granularity and processing are these services applicable?”*

Premise: If everyone models the same thing in the same way we have the basis of interoperability

- Common metadata will not solve this problem
- INSPIRE Document D2.6 sets the framework for data modelling

ISO19115

- Abstract standard for geospatial metadata
- There will be an INSPIRE 19115 profile
 - For discovery of datasets
 - Will be used to update UK Gemini

ISO19139

- Normative serialisation of 19115 in XML

Metadata

- “How a dataset is”

ISO19131

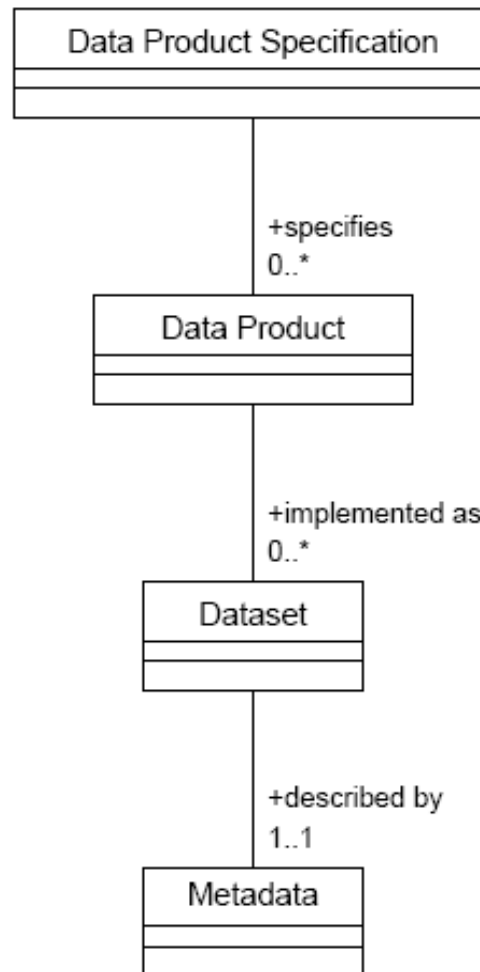
- Abstract standard for geospatial data product specification
- No normative serialisation

Data Product Specification

- “How a dataset should be”
- There will be an INSPIRE 19131 DPS for each of the 30 themes
 - INSPIRE Publication D2.6

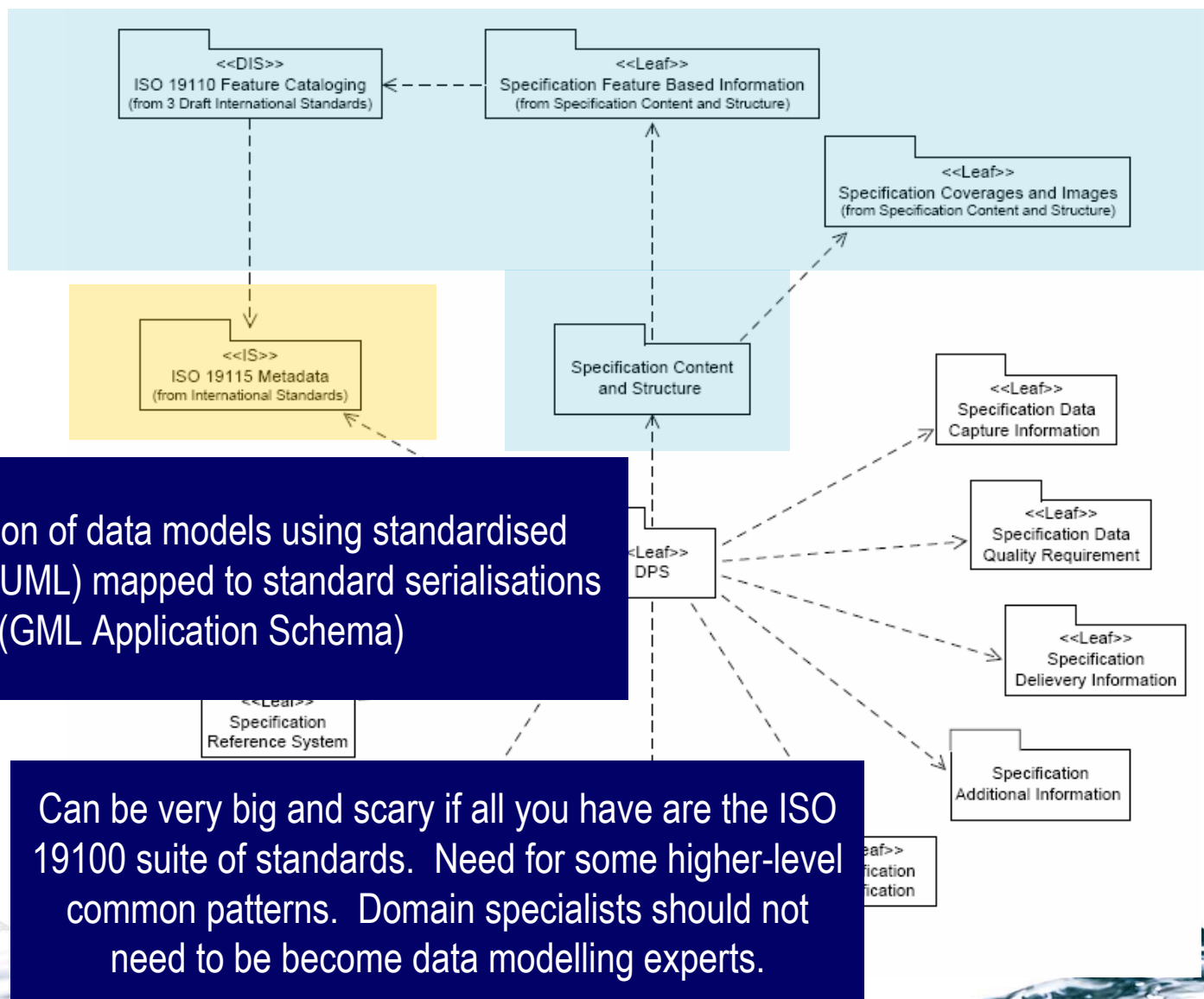
DPS and Metadata

Government Departments
Data commissioners



Data collectors
Data processors





Formalisation of data models using standardised approaches (UML) mapped to standard serialisations (GML Application Schema)

Can be very big and scary if all you have are the ISO 19100 suite of standards. Need for some higher-level common patterns. Domain specialists should not need to become data modelling experts.

Platform independence

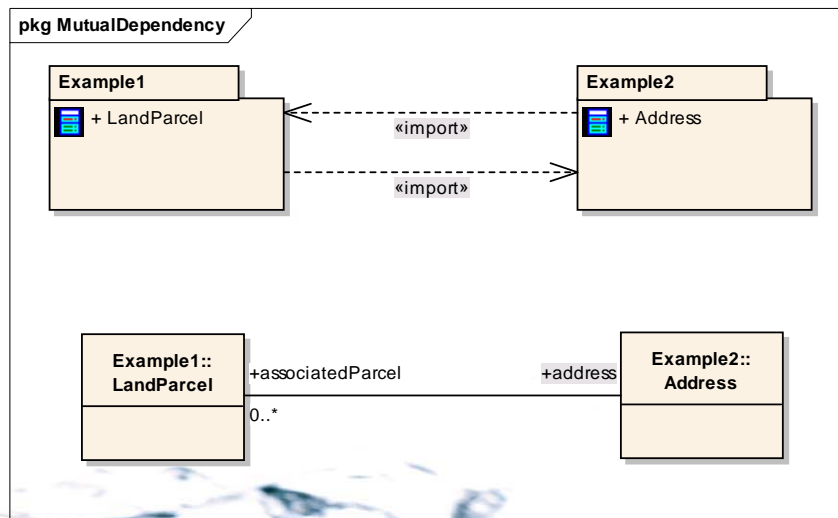
- Ensure that different domain models exist at the same conceptual level
 - Use **INSPIRE methodology** as ‘best practice’
- Avoid structures and datatypes that are technology specific

Package Modularity

- Ensure any definitions imported from an external domain are encapsulated in a separate package

Avoid Mutual Interdependence

- Causes significant implementation and maintenance problems



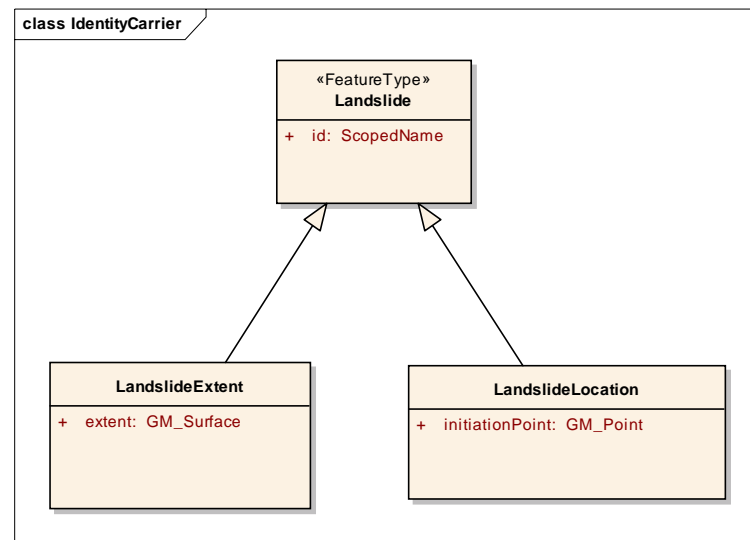
Pattern for harmonising different levels of abstraction in a domain model

- Especially useful for common semantics of multiple ‘implementation-orientated’ data models

Very simple ‘super-class’ that contains:

- Common agreement the object exists
- Governance authority to designate the identity

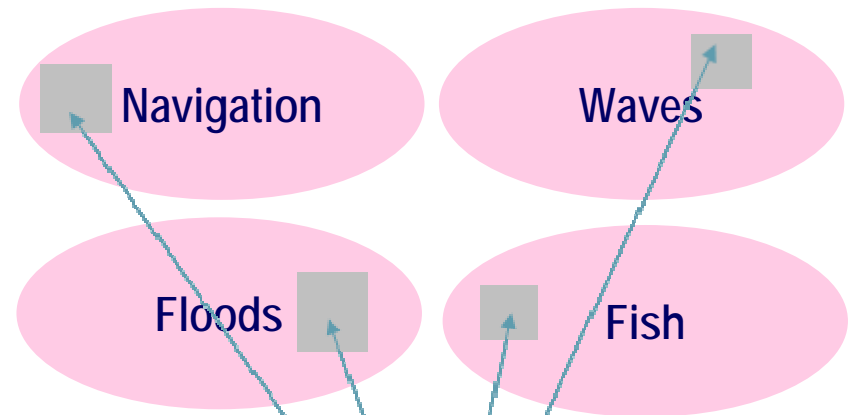
INSPIRE Annex’s should all have an “identity carrier”



Landslide feature is implemented with different geometries, yet it is agreed that the feature instance is the same in each case. Same could apply to ‘waves’ for example

O&M is an OGC Recommendation

- provides a building block to create consistent approaches to modelling observations.
- Applicable to any domain
- Needed for automated sampling and data processing system



Assigned them a common identity pattern so I know they are all 'marine' things

But each domain will have common inter-domain patterns. Probably the most important relates to how the marine thing is observed and measured

The approaches in this presentation can be summarised from the perspective of the governance requirements of cross-domain semantic harmonisation:

- Clear governance of reusable aspects of models, through identification of reusable packages;
- The use of an identity-carrier to unambiguously reference objects across domains without the complications of domain-specific implementation detail;
- Use of Observations and Measurements (and similar high-level abstractions) to provide extensible metadata for any domain;

These approaches form a minimal toolkit for the creation of interoperable domain models.

- They also provide convenient building blocks for simplifying the process of creating domain models.

At the time of writing, these approaches have been identified as patterns that can be re-used.

- The need is for formalisation, publication and integration of these patterns into formal methodologies, such as INSPIRE Data Product Specification development.
- The next step is to undertake more extensive testing and refinement of these patterns within significant cross-domain harmonisation activities.



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Full paper to be submitted to on-line journal
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<http://ijsdir.jrc.it/>