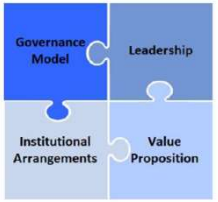
“the case for change – integrate, integrate, integrate”.

Introduction



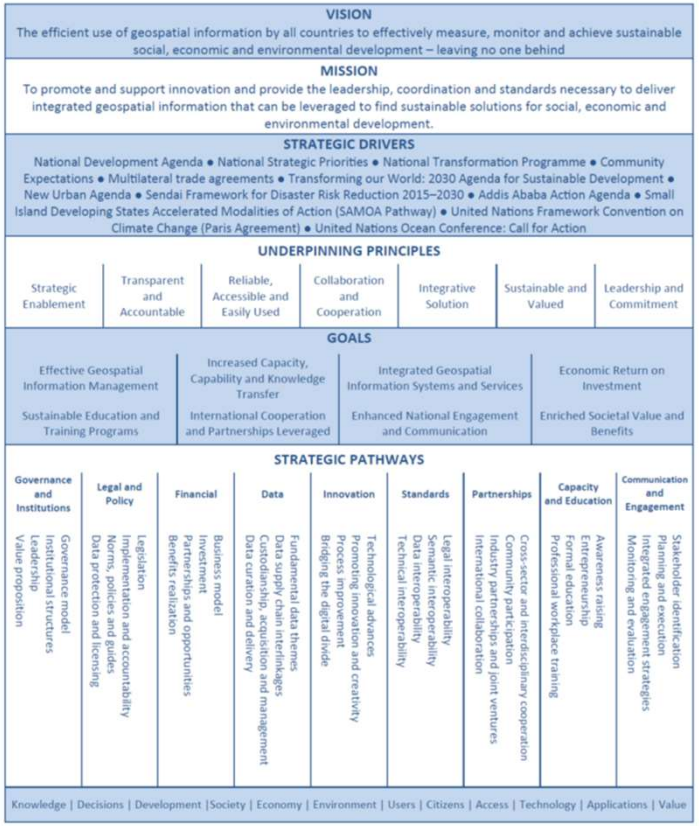
- The Case for Change – is there one?
- “Integrate” – should we?

- Definitions and applicability of integration
- The case for integration
- The relationship between “value”, “integration” and “reuse”

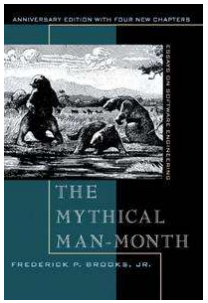
- The connection with the operational framework

What is “integrate” and why should we care?

- The operational framework itself represents the sum view of best practices for building infrastructure across many axes
- Integration is a core element.
- Integration only exists in relation “to something” – the thing(s) you integrate
  - Between sectors
  - Across different data models (“interoperability”)
  - Geographic domains, Land and Sea
- Integration enables multiple uses in different contexts, it is “re-use”



The Parallel with Software Engineering

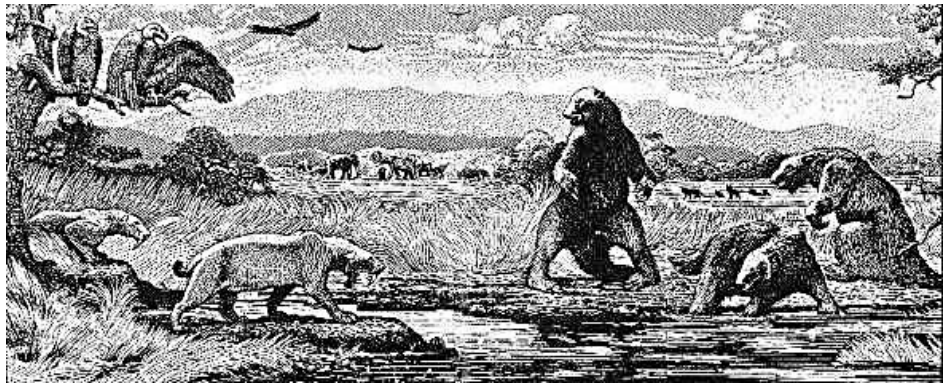


- From an engineering standpoint – reuse has its roots in the complexities which emerged with technology development
  - "Programmers have always reused sections of code, templates, functions, and procedures. Software reuse as a recognized area of study in software engineering, however, dates only from 1968 when Douglas McIlroy of Bell Laboratories proposed basing the software industry on reusable components."
  - "standardisation results in creation of interoperable parts that can be then reused in many contexts"

- Whether you integrate is profoundly connected with the value of effecting such integration.

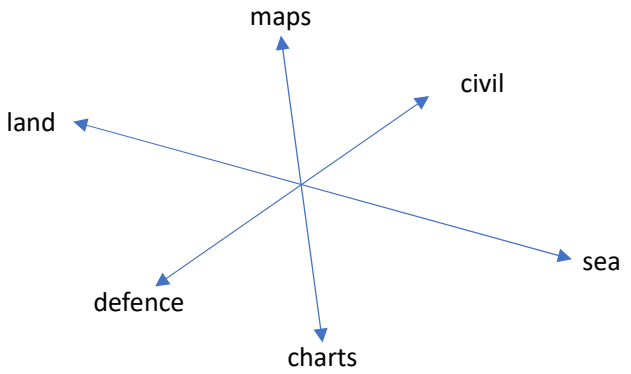
- Economically, we know that engineering re-use costs more. In software >9x single-use costs.

"No scene from prehistory is quite so vivid as that of the mortal struggles of great beasts in the tar pits. ***The fiercer the struggle, the more entangling the tar, and no beast is so strong or so skillful but that he ultimately sinks***."



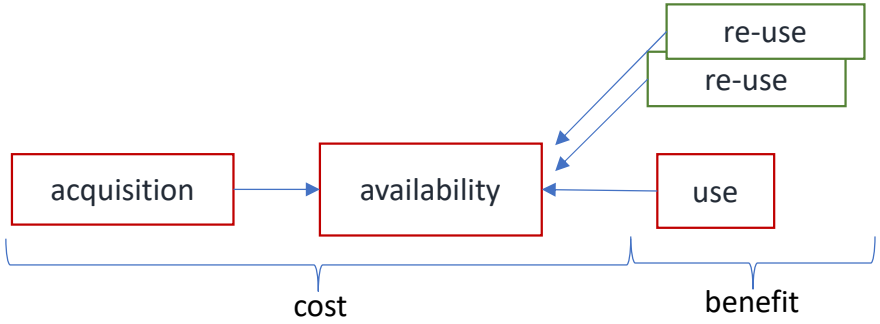
The Axes of Integration

- There are many…
  - Between sectors
  - Across different data models (“interoperability”)
  - Geographic domains, Land and Sea
  - Institutional arrangements
- Integration in the IGIF context is not just integration of data, but an “integrative approach” to EVERYTHING
- Whether to integrate connects with value of integration, value and amount of re-use and utility of such reuse.
- “If you were only making charts, reuse isn’t important” – few people only make charts.
- There are numerous other factors which affect value and an integrated view of them all is required to make the right decisions
- These are not purely technical issues, often they are economic
- There are domain-specific considerations



Domain specific considerations

- Cost of data acquisition is high
- Dynamic nature of our medium
- Delimited boundaries and limits
- International vs National priorities
- Specialised nature of domain
- Land / Sea interfaces



Integration of marine geospatial data:

- Founded on interoperability between entities
- Coherent models
- Data sharing partnerships
- Compatible standards
- Authoritative, curated datasets
- Custodianship
- Persistent, unique identifiers

IHO Definition: **RIVER**. A relatively large natural stream of water. (IHO Dictionary – S-32)

S-101 Geo Feature: River (RIVERS)

Primitives: Curve, Surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Feature name			C	0,*
Display name			(S) BO	0,1
Language		ISO 639-1	(S) TE	0,1
Name	(OBJNAM) (NOBJNM)		(S) TE	1,1
Status	(STATUS)	5 : periodic/intermittent	EN	0,1
Scale minimum	(SCAMIN)	See clause X.X	IN	0,1

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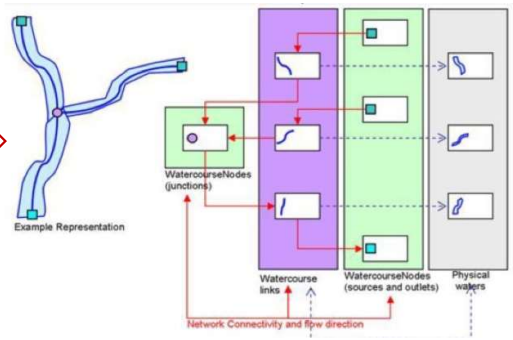
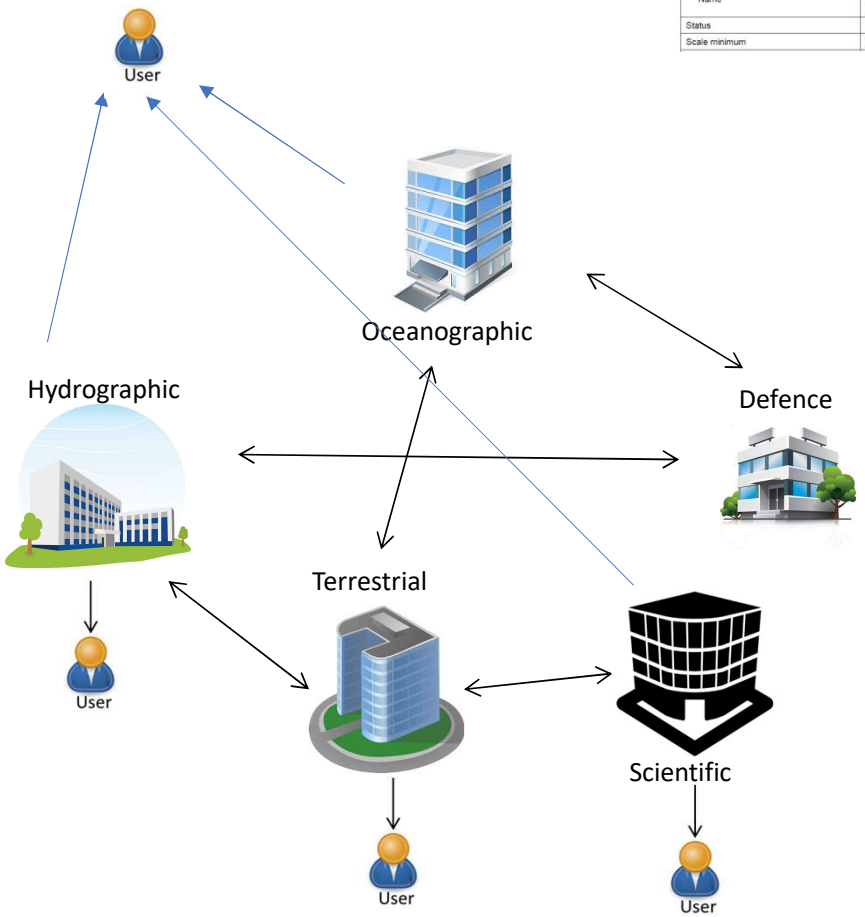
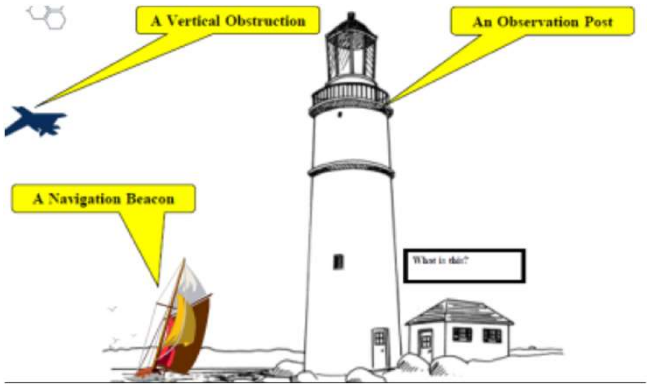




Looking at integration purely in the context of data ignores the bigger picture of the other axes

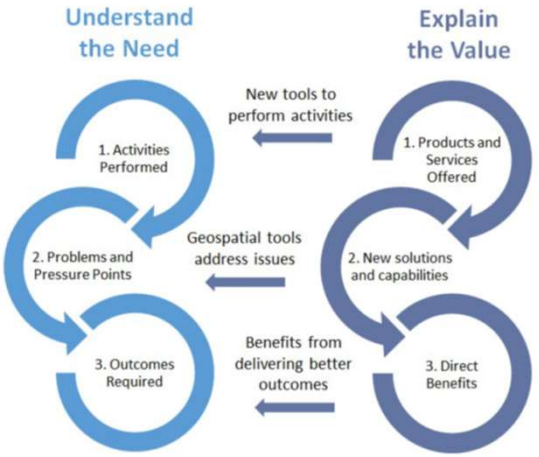


IGIF-H and Value

- Drives the case for creating re-usable data
- Establish a concept of "value"- "In economics, economic value is a measure of the benefit provided by a good or service to an agent."
- "the value of an asset calculated according to its ability to produce income in the future"
- What are we trying to achieve with the IGIF-H?
  - Put forward guiding principles
  - Offer re-usable value propositions because there are common elements of value in most implementations
  - Our considered value propositions are in IGIF-H
  - Each implementation will require further adaptation

Value Propositions demand considerations broader than financial and technical. The *value* is the progress towards the achievement of the sustainable development goals.

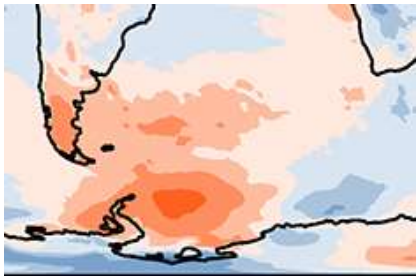
Software systems have limited lifespans, geospatial data is persistent (because the world is) – so the payback is "when, not if"

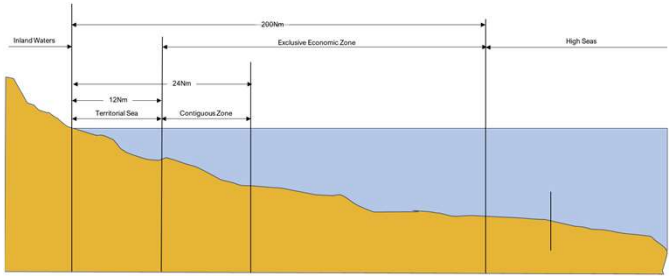


Step 3: Create the Value Proposition Statement:

"Satellite remote sensing is used to monitor change in the environment, and this capability is used to inform government policy on the management of the environment, so that best practices land management techniques are adopted to preserve the environment for future generations."

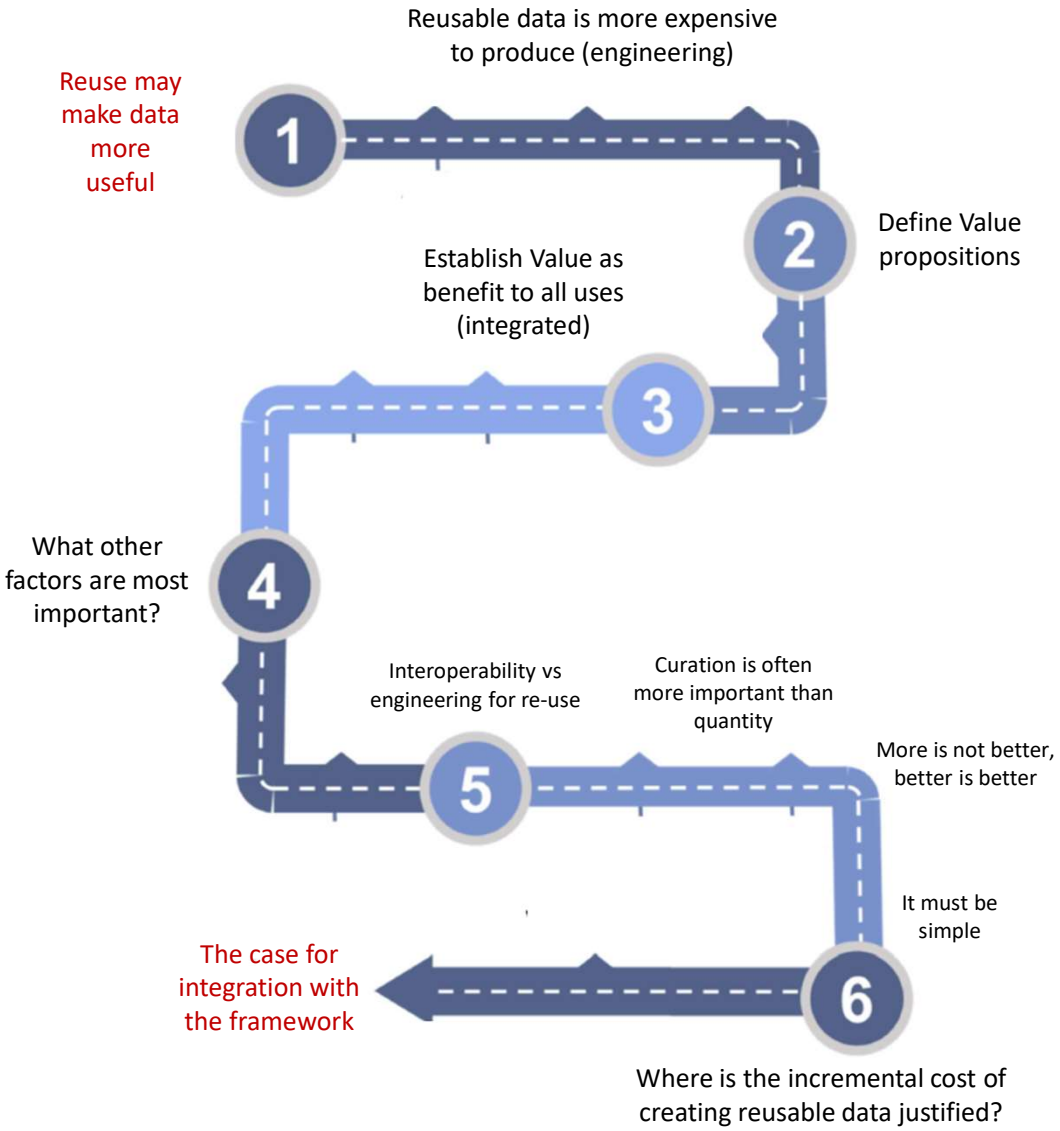
1.Nautical Charting and Transportation
2.Support for Resource Management and Planning
3.Establishing Maritime Boundaries
4.Subsistence
5.Emergency Response, Disaster Management and Response
6.Integrated Marine Cadastral Systems
7.Energy
8.Environmental Protection
9.Climate Change
10.Scientific Research





The journey, making the case for change…

- All implementers make their own case for integration of marine geospatial data
- Integration is present in MANY other considerations during implementation
- The reason we reuse is because of its value (however you measure it)
- Value propositions quantify the benefits of all data
- Marine geospatial data has many common elements across all participants so value propositions can be reused and adapted
- Each case is individual and there are always other considerations
- The ultimate integration is the approach itself.



So what?

- We must recognise and accept different interpretations of “integrate”
- Integration is both the overall approach as well as many of the tactics
- But tactics must be adapted for the individual situation
- Remember other factors, curation, quality, simplicity
- Reflect best practices and simple steps for implementers
- Strengthen the implementation aspects of highest priority
  - Value Propositions and their role in defining tactics
  - Simple guides to achieving interoperability
  - Open Standards, open source technologies
  - Persistent unique identifiers and their importance for custodianship
  - Themes