

Hydrographic Services and Standards Committee

OGC Update to IHO HSSC

Scott Simmons: Chief Operations Officer, OGC

Andy Hoggarth: Chair OGC Marine DWG



Content

- Standards passed / TC Meetings
- Marine projects
- OGC API
- Publication content management
- Marine DWG activities



Standards approved since September 2018

- Standards
 - 3D Tiles 1.0 [18-053r1] (OGC Community standard)
 - OGC Abstract Specification Topic 2 - Referencing by Coordinates [18-005r3]
 - OGC GeoPackage Related Tables Extension [18-000]
 - Features and Geometries - Part 1 - Feature Models [17-087r13]
 - Time Ontology in OWL [OGC 16-071r2]
 - Semantic Sensor Network Ontology [OGC 16-079]
- Standards under vote
 - OGC Two Dimensional Tile Matrix Set [OGC 17-083r1]
 - HDF5 Core 1.0 [OGC 18-043r3]
 - Well Known Text Representation of Coordinate Reference Systems (CRS WKT) [OGC 18-010r6]
 - PipelineML [18-073r2]

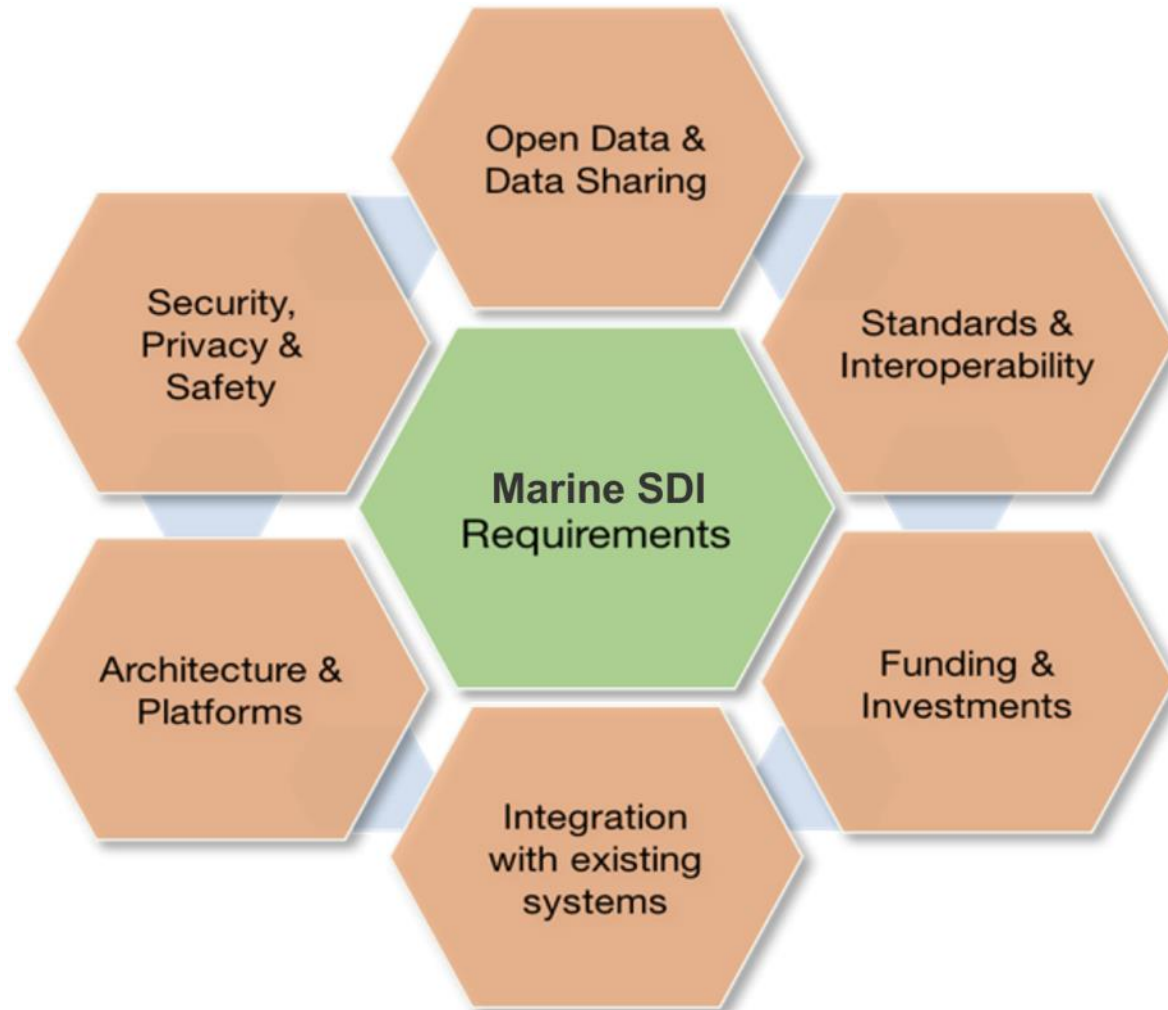


Technical / Planning Committee Meetings

Date	Location	Host/Sponsor
25 Feb – 1 Mar 2019	Singapore	NUS/SLA/MPA
24-28 June 2019	Leuven, Belgium	KU Leuven
9-13 September 2019	Banff, Canada	University of Calgary
mid-Nov 2019	Toulouse, France	Airbus
March 2020	Hong Kong (TBC)	
June 2020	Montreal, Canada	CAE
14-18 Sept 2020	Munich, Germany	TUM
30 Nov – 4 Dec 2020	Palo Alto, CA USA	EPRI



Marine SDI requirement categories



Marine MSDI CDS Workshop – speakers and panelists

- Helen Brohl - Executive Director, U.S. Committee on the Marine Transportation System (CMTS)
- Sebastian Carisio - NGA | Vice-Chair, IHO MSDIWG | Chair, ARMSDIWG | Co-Chair, OGC Marine DWG
- Dr. Terry Idol - Director, OGC
- Jens Peter Hartmann - Danish Geodata Agency International Coordinator | Chair, IHO MSDIWG | Chair, BS-NSMSDIWG
- Dr. Luis Bermudez - Executive Director, OGC Innovation Program
- Patrick Keown - NOAA Office of Coast Survey (OCS)
- Jim Rogers - NGA | Chair, MACHC MEIP
- Tim Battista - NOAA National Centers for Coastal Ocean Science (NCCOS)
- Ellen Vos - Hydrographic Office - Royal Netherlands Navy



More speakers and panelists

- CDR Brock Eckel - White House Office of Science and Technology Policy
- Mr. Matt Chambers - USDOT Bureau of Transportation Statistics
- LCDR Marlon Heron - USCG Navigation Center
- John Lowell - NGA Senior GEOINT Authority – Maritime
- Supriti Jaya Ghosh - Senior Maritime Policy Advisor - CMTS
- Mr. Brian Tetreault - USACE Engineer Research and Development Center
- LCDR Brock Eckel - White House Office of Science and Technology Policy
- Mr. Matt Chambers - USDOT Bureau of Transportation Statistics
- LCDR Marlon Heron - USCG Navigation Center
- Rafael Ponce - Esri
- Karen Hart - Teledyne CARIS
- Andy Hoggarth - Teledyne CARIS
- Jonathan Pritchard - IIC Technologies
- John Nystrom - Esri



Contributors to the Engineering Report

- National Geospatial-Intelligence Agency (sponsor)
- Arctic Spatial Data Infrastructure (Arctic SDI)
- British Oceanographic Data Centre (BODC)
- Canadian Hydrographic Service (CHS)
- Cooperative Institute for Research in Environmental Sciences (CIRES)
- Danish Geodata Agency, Danish Hydrographic Office
- Directorate of Hydrography and Navigation (BRAZIL)
- Esri
- Geographic Information System Service (GISS)
- Geoscience Australia - Marine Geoscience Group
- The HDF Group
- Helyx Secure Information Systems Ltd
- Hexagon Geospatial
- International Hydrographic Organization (IHO)
- IIC Technologies
- Italian Hydrographic Institute (IIM)
- Land Information New Zealand (LINZ)
- Marine Environmental Data and Information Network (MEDIN)
- National Geospatial-Intelligence Agency (NGA), Maritime Safety Office (MSO)
- National Oceanic & Atmospheric Administration (NOAA), Office of Coast Survey (OCS)
- National Technical University of Athens (NTUA)
- Natural Resources Canada: GeoConnections and Fisheries and Oceans Canada (DFO)
- Naval Research Laboratory (NRL)
- Navy Hydrographic Center
- Netherlands Hydrographic Service
- Norwegian Mapping Authority (Kartverket)
- OceanWise Limited
- OGC Marine Domain Working Group (OGC Marine DWG)
- Portuguese Hydrographic Institute
- Sounding Science LLC & Geopoint Solutions
- Teledyne CARIS
- United Kingdom Hydrographic Office (UKHO)
- U.S. Army Engineer Research and Development Center
- U.S. Coast Guard Navigation Center
- U.S. Committee on the Marine Transportation System (CMTS)
- U.S. Department of Transportation (DOT)
- U.S. Energy Information Administration (EIA)
- University Of Colorado Boulder
- University of Southern Mississippi (USM)
- White House Office of Science and Technology Policy

Next steps

- Accept input from IHO member states to finalize report: intent is to have a joint IHO/OGC publication
- Begin planning of Pilot Project to demonstrate and prove output from CDS
- Looking for sponsors of the Pilot Project
 - Please contact me if you are interested!



Maritime Limits and Boundaries Pilot

Schedule

Feb 25 2019	<u>Call for Participation</u>
March 12 2019	<u>Clarifications Webinar</u>
Mar 19 2019	Response due Call for Participation
Mar 23 2019	Selection of Participants and Bidder Notifications
Mar 28 2019	Participation Agreements
May 14-15 2019 (Ottawa)	Kickoff Phase I
Sep 26 2019	End Prototype Development Phase 1
Sep 26 2019	Draft Report Phase 1
October 2019	Virtual Kickoff Meeting Phase 2
Feb 21 2020	Engineering Report
Mar 18 2020	Demonstration
Mar 31 2020	End Prototype Development Phase 2

OGC Maritime Limits and Boundaries Pilot

Sponsors:

- Geoscience Australia
- Canadian Hydrographic Service
- Natural Resources Canada
- United Kingdom Hydrographic Office



Goal

The pilot will advance **the implementation of the S-121 data model and architecture**, and will implement **operational prototypes to support the creation, management, integration, dissemination and onward use of official data for maritime baselines, limits, zones and boundaries**. Will support:

- **Country level publication**, as a national obligation, of their maritime baselines, limits and boundaries
- Standards-based geospatial **interoperability between supplier, user and partners**, within and across governments, public and commercial users
- Facilitating **strategic awareness and operational decision making** in the maritime environment supporting good governance and effective and efficient operations

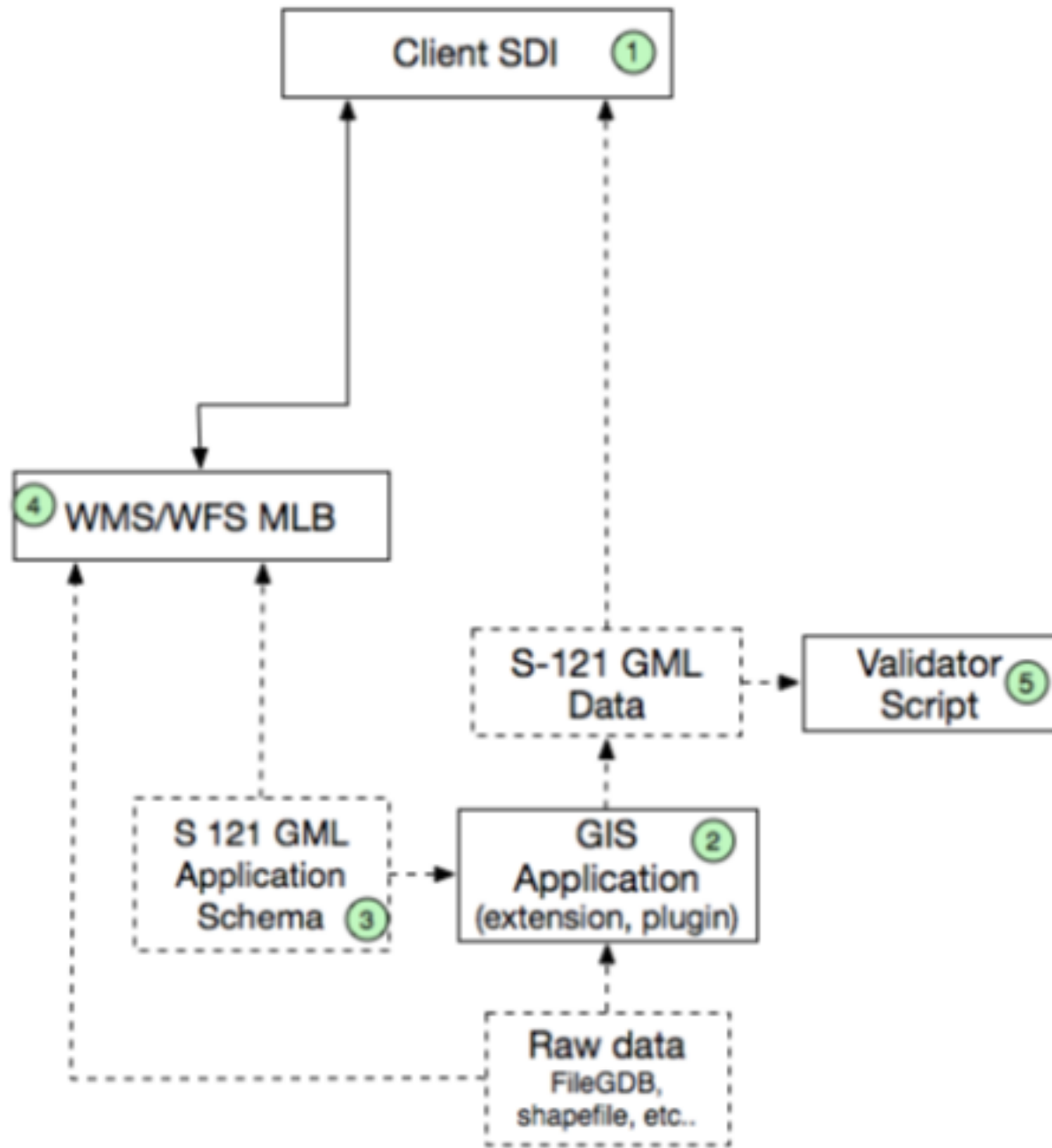


Figure 2. Phase 1 - Prototyping

Phase 1 will focus on advancing GIS Applications to implement the S-121 Data Model. The primary task is to develop a GML Application Schema that properly represents the data model. GIS Applications, based on the GML Application Schema, will read raw data and convert it to S- 121.

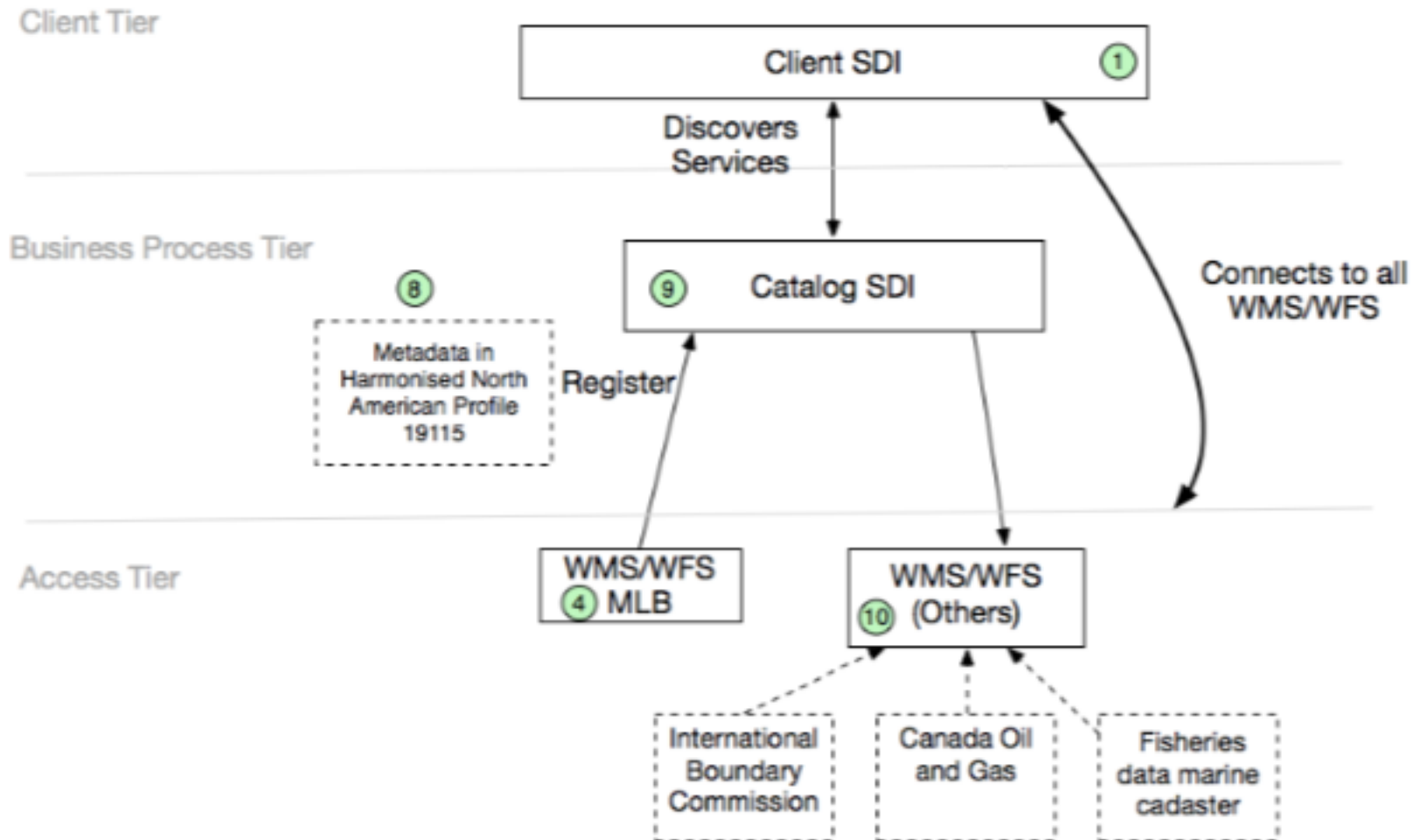


Figure 3. Phase 2 - Prototyping CGDI

OGC API

Massive revision to OGC web service standards underway

OGC API family of standards

- Modernization of web service standards (W*S) started with Web Feature Service v. 3
- Leveraging OpenAPI to define the API in developer terms
- Additional standards following same pattern:
 - Processing
 - Map Tiles
 - Coverages
- Standards will be named “OGC API - [resource]”
 - OGC API - Features, OGC API - Processing, etc.
- Old W*S standards don’t go away, but will have minimal future revision



It was already happening...

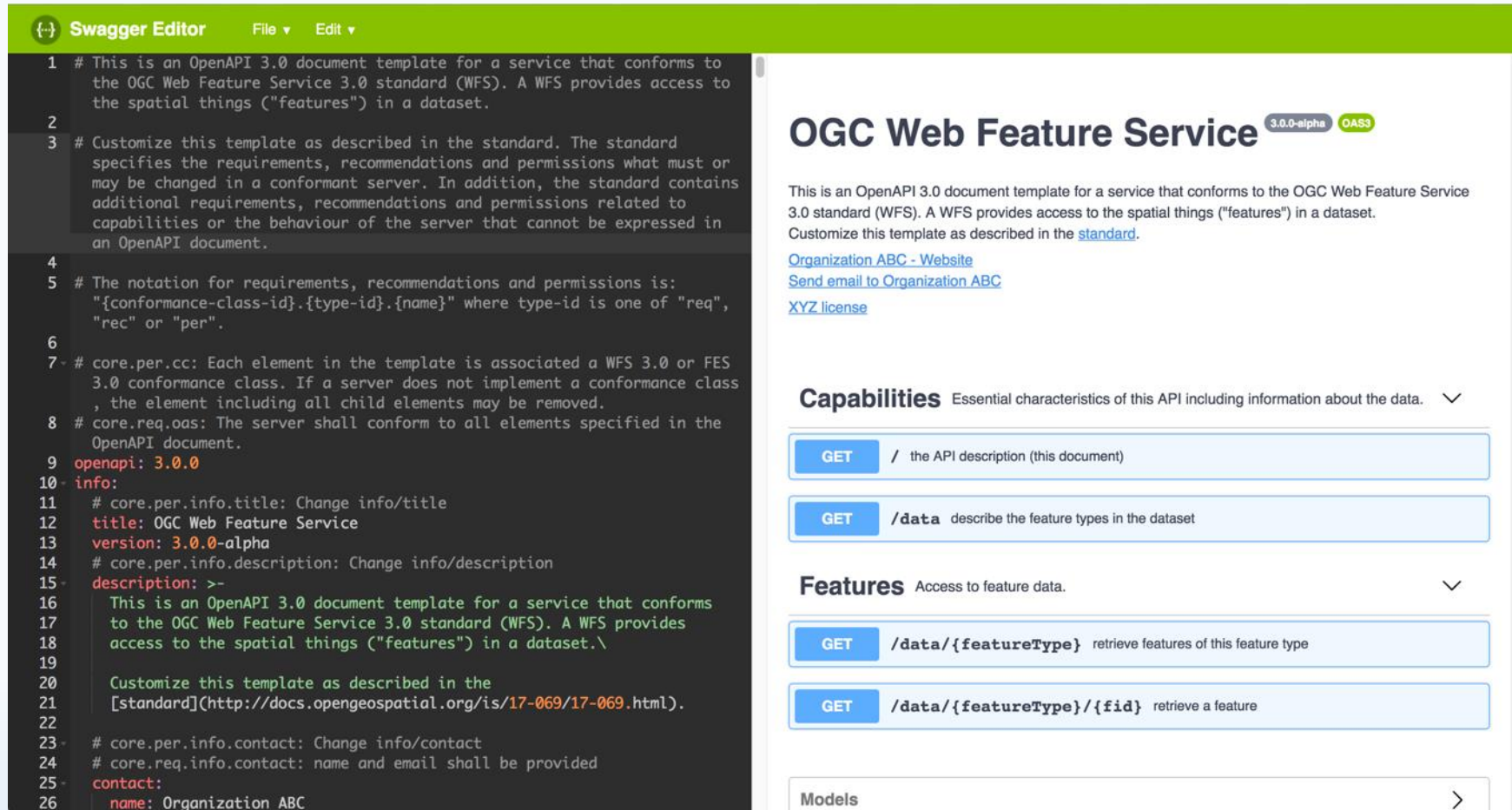
<https://ukho.portal.azure-api.net/docs/services/58f944d83e1431114cccd1f1/export?DocumentFormat=Swagger>

Try it: <https://ukho.portal.azure-api.net/docs/services/58f944d83e1431114cccd1f1/operations/58f944da3e14310718fe00e1>

The image shows the Swagger Editor interface. On the left is a code editor with a Swagger 2.0 definition for 'OGC_WMS_ENC'. The definition includes metadata like title, version, and description, as well as security definitions for API keys and a 'get' endpoint for '/webcharting/WMS_ENC/v130/v1/GetMap'. On the right is the rendered UI view, which displays the service title 'OGC_WMS_ENC 1.0', the base URL 'ukho.azure-api.net/api', and the description. It features a 'Schemes' dropdown set to 'HTTPS' and an 'Authorize' button. Below, the 'default' section shows the 'GET' method for the '/webcharting/WMS_ENC/v130/v1/GetMap' endpoint. At the bottom, the 'Models' section lists two response models: 'WebchartingWMS_ENCv130V1GetMapGet200ApplicationJsonResponse' and 'WebchartingWMS_ENCv130V1GetMapGet200Text.JsonResponse'.

```
1 swagger: '2.0'
2 info:
3   title: OGC_WMS_ENC
4   version: '1.0'
5   description: OGC Web Mapping Service (V1.3.0) for UK ENC data
6 host: ukho.azure-api.net
7 basePath: /api
8 schemes:
9   - https
10 securityDefinitions:
11   apiKeyHeader:
12     type: apiKey
13     name: Ocp-Apim-Subscription-Key
14     in: header
15   apiKeyQuery:
16     type: apiKey
17     name: subscription-key
18     in: query
19 security:
20   - apiKeyHeader: []
21   - apiKeyQuery: []
22 paths:
23   /webcharting/WMS_ENC/v130/v1/GetMap:
24     get:
25       description: "A Web Map Service (WMS) produces maps of spatially
referenced data dynamically from geographic information. \r\nThis
International Standard defines a "map" to be a portrayal of
geographic information as a digital image file suitable for
display on a computer screen.\r\nA map is not the data itself.WMS
-produced maps are generally rendered in a pictorial format such
as PNG, GIF or JPEG, \r\nor occasionally as vector-based graphical
elements in Scalable Vector Graphics (SVG) or Web Computer
Graphics Metafile(WebCGM) formats. \r\n\r\nThis service supports
version 1.3.0 of the OGC WMS Specification http://www
```

OGC API - Features OpenAPI document



The image shows the Swagger Editor interface. On the left, the OpenAPI 3.0 document template is displayed in a code editor. The template includes comments for customization and a JSON structure for the API's metadata and description. On the right, the rendered preview shows the API's title, version, description, and a list of endpoints under the 'Capabilities' and 'Features' sections.

```
1 # This is an OpenAPI 3.0 document template for a service that conforms to
2 the OGC Web Feature Service 3.0 standard (WFS). A WFS provides access to
3 the spatial things ("features") in a dataset.
4
5 # Customize this template as described in the standard. The standard
6 specifies the requirements, recommendations and permissions what must or
7 may be changed in a conformant server. In addition, the standard contains
8 additional requirements, recommendations and permissions related to
9 capabilities or the behaviour of the server that cannot be expressed in
10 an OpenAPI document.
11
12 # The notation for requirements, recommendations and permissions is:
13 "{conformance-class-id}.{type-id}.{name}" where type-id is one of "req",
14 "rec" or "per".
15
16 # core.per.cc: Each element in the template is associated a WFS 3.0 or FES
17 3.0 conformance class. If a server does not implement a conformance class
18 , the element including all child elements may be removed.
19
20 # core.req.oas: The server shall conform to all elements specified in the
21 OpenAPI document.
22
23 openapi: 3.0.0
24 info:
25 # core.per.info.title: Change info/title
26 title: OGC Web Feature Service
27 version: 3.0.0-alpha
28 # core.per.info.description: Change info/description
29 description: >-
30 This is an OpenAPI 3.0 document template for a service that conforms
31 to the OGC Web Feature Service 3.0 standard (WFS). A WFS provides
32 access to the spatial things ("features") in a dataset.\
33
34 Customize this template as described in the
35 [standard](http://docs.openeospatial.org/is/17-069/17-069.html).
36
37 # core.per.info.contact: Change info/contact
38 # core.req.info.contact: name and email shall be provided
39 contact:
40 name: Organization ABC
```

OGC Web Feature Service 3.0.0-alpha OAS3

This is an OpenAPI 3.0 document template for a service that conforms to the OGC Web Feature Service 3.0 standard (WFS). A WFS provides access to the spatial things ("features") in a dataset. Customize this template as described in the [standard](#).

[Organization ABC - Website](#)
[Send email to Organization ABC](#)
[XYZ license](#)

Capabilities Essential characteristics of this API including information about the data. ▼

- GET** / the API description (this document)
- GET** /data describe the feature types in the dataset

Features Access to feature data. ▼

- GET** /data/{featureType} retrieve features of this feature type
- GET** /data/{featureType}/{fid} retrieve a feature

Models ▶





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joanma747 Update README.md	Latest commit 195c1ec on Sep 9
Guidance/images Delete standard.css	3 months ago
Resources Rename Guidance/clause_8_Resources.adoc to Resources/clause_8_Resourc...	3 months ago
LICENSE Initial Template	3 months ago
README.md Update README.md	a month ago

[README.md](#)

OGC Web API Guidance

A Comprehensive Set of Guidelines for developing OGC Web APIs

ISO + OGC: OGC API - Feature = ISO 19168

- https://github.com/opengeospatial/WFS_FES
- Github repo is available to the public, but...
- **... only TC 211 / OGC members can vote and make final decisions on content**
- Documentation is organized per AsciiDoc OGC standard template, but text itself is full of examples, plenty of OpenAPI content



OWS Evolution

- WFS3
 - Public comment period complete
 - Coordination with ISO
- WPS3
 - API in public GitHub with implementations
 - Public comment coming soon
- WMS/WMTS
 - Vector Tiles Pilot results
 - Draft OpenAPI definition
 - WMTS direct link to OWS Common work
- Catalogue
 - STAC using WFS3, coordinating with OGC
 - CSW4 (draft, unofficial)
- Coverages
 - 2018: Testbed 14 & Met/Ocean Hack
 - 2019: Hackathon supported by several members
- OWS Common
 - [API Common Guidelines](#)
 - [API Common Spec](#) with requirements
- Messaging
 - Naming OWS revisions
 - OGC the organization

OGC



JUN
20

OGC API Hackathon

by Open Geospatial Consortium

Free



Register

Description

The Open Geospatial Consortium (OGC) is organizing a Hackathon to develop OGC Application Programming Interface (API) specifications and invites you to participate.

This hackathon will test draft OpenAPI-based standards for coverages, map tiles, processes using a common template based on the OGC API for features, aka WFS3 [1].

The event will be instrumental to the evolution of the OWS standards to a modern API based approach, setting the course for open geospatial standards for the next decade. The hackathon will be organized around:

Date And Time

Thu, Jun 20, 2019, 9:00 AM -
Fri, Jun 21, 2019, 5:00 PM BST
[Add to Calendar](#)

Location

Sutton Yard.
65 Goswell Road
London
EC1V 7EN
United Kingdom

Publication content management

Work done to date

- OGC standards user community generally prefers HTML content
- All OGC document templates are now in AsciiDoc and stored in GitHub
 - Result is faster, cleaner, and more consistent publication to HTML and PDF
 - Still support MS Word, but those documents now get translated to AsciiDoc for processing
- Final publication is:
 - HTML: normative
 - PDF
 - Word



Assessing now

- OGC wishes to publish alternative forms of its standards, such as developer-friendly summaries heavy on code samples and light on text
- Moving standards to ISO requires significant formatting
- OGC is participating in the ISO initiative to develop machine-readable standards
- Testing Metanorma framework from Ribose, Inc.
 - Free to SDOs
 - Will share findings with IHO



The screenshot shows the Metanorma website interface. At the top, there is a purple navigation bar with the Metanorma logo (a stylized 'M' with a rocket) and the tagline 'AEQUITATE VERUM'. To the right of the logo are links for 'Authoring docs', 'Flavors', 'Specs', 'Blog', and a search icon. Below the navigation bar, the main heading reads 'Write Open Geospatial Consortium documents with Metanorma'. Underneath this, there is a 'Quick start' section with two bullet points: 'Play with a [sample Metanorma-OGC project](#)' and 'Build Metanorma-OGC documents with a command like this:'. A code block shows the command: `metanorma --type ogc --extensions pdf,html {my-document-filename.adoc}`. A final bullet point says 'Check out [guide](#) for authoring OGC documents with Metanorma and AsciiOGC markup language'.



Marine Domain Working Group update

Andy Hoggarth

OGC participation in GEBCO meeting in Canberra

- OGC Marine DWG invited to present in the GEBCO TSCOM meeting
- OGC Marine DWG co-chair presented keynote address in the Map the Gaps symposium
- Discussion topics included:
 - Metadata for Bathymetry
 - Interest in DGGS for Seabed 2030 data discovery
 - Potential use of Artificial Intelligence for cleaning bathymetry (especially CSB)
 - Use of Cloud technology and OGC Web services for data distribution
 - Requested GEBCO involvement in Singapore Marine Summit to describe Seabed 2030 project



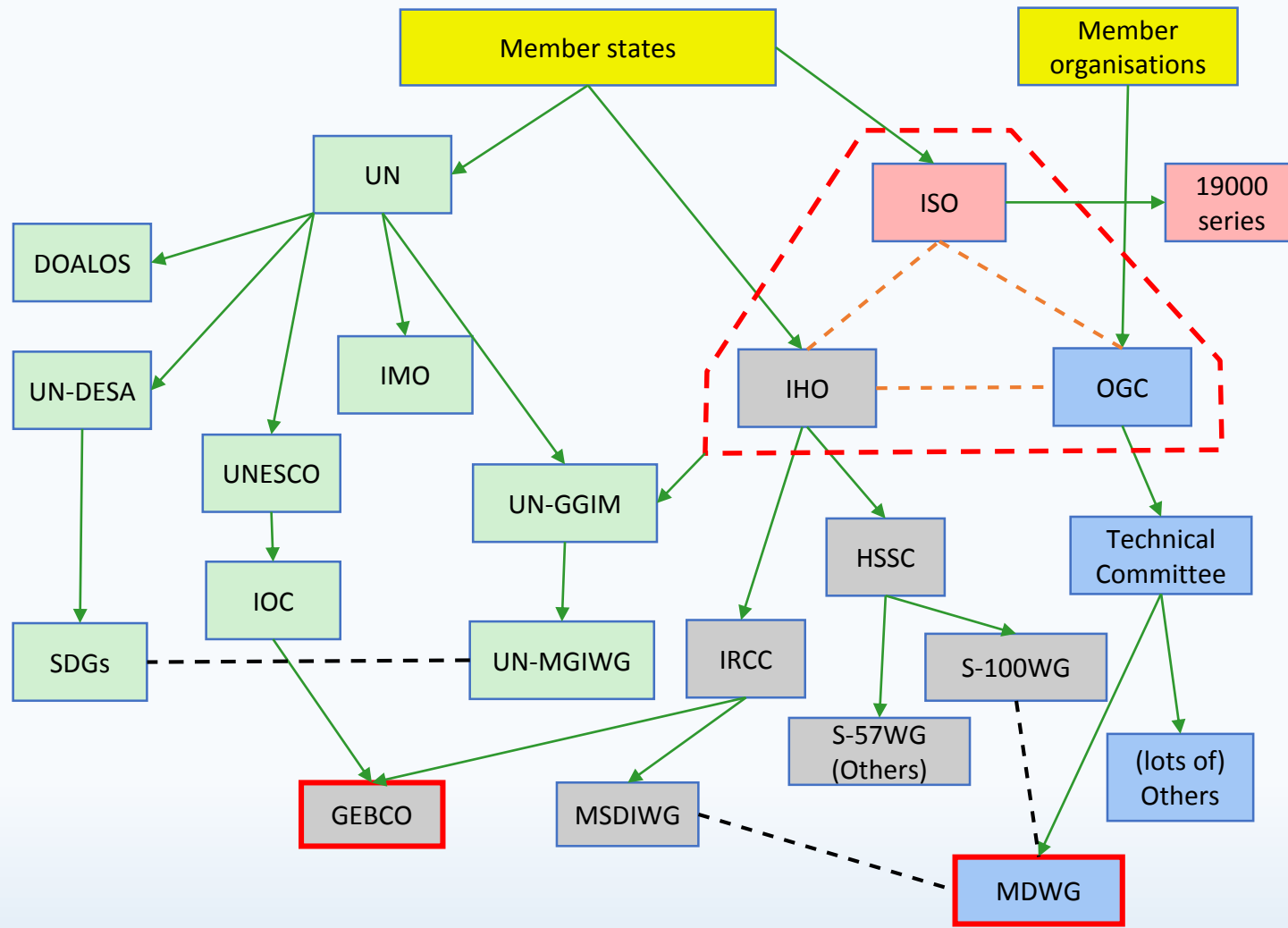
3D DGGS interest for Depth and Elevation

- A 3D DGGS could be an excellent way to discover and analyze the Seabed 2030 global bathymetry dataset
- The new chair of GEBCO TSCOM (Dr Thierry Schmitt, SHOM) is very interested
- Potential for TSCOM to look at DGGS, also interest at the regional level
- Additional interest from an EMODnet perspective
- Peter Strobl from the European Commission's Copernicus Earth Observation program has identified a similar need for a 3D grid representation
 - Interesting to look at a joint initiative to present land and sea DEMs together in a DGGS





Relationship diagram between Groups



Singapore Marine Summit Agenda

- **AGENDA**

- **Session 1. Introduction, Keynote and MSDI – Chair: Trevor Taylor**

- Welcome to the Marine Summit, OGC overview and objective for the day – Trevor Taylor, OGC
- Key Note Speech – Cathrine Armour, UKHO
- Singapore MSDI concept GeoSpace-Sea – Jamie Chen, MPA
- The Natural Capital Project – Dr. Dan Friess, NUS

- **Session 2. Marine Geospatial Standards – Chair: Jonathan Lewis**

- IHO, OGC and industry standards collaborations – Jonathan Pritchard, IIC
- Spatio-Temporal Datacubes for Marine Big Data: Concepts, Standards, Tools – Dr. Peter Baumann, Jacobs University
- Challenges around environmental data exchange formats – Byron Cochrane, representing NIWA

- **Session 3. Bathymetry – Chair: Andy Hoggarth**

- AusSeabed: Standardising seabed mapping data for the development of a National data hub – Kim Picard, Geoscience Australia (REMOTE)
- Seabed 2030 Project Overview – Dr. Thierry Schmitt, SHOM, co-chair GEBCO TSCOM (REMOTE)
- Discrete Global Grid Systems in the Marine Context – Dr. Matthew Purss – Geoscience Australia

- **Session 4. Innovations – Chair: Jonathan Pritchard**

- S-102 bathymetry data as a service – Andy Hoggarth, Teledyne Caris
- Achieving maritime domain awareness through standards – Frederic Houbie, Hexagon
- METIS - A Marine Environmental Information System – Choo Heng Kek, National University of Singapore
- Closing Remarks – OGC co-chairs and MPA

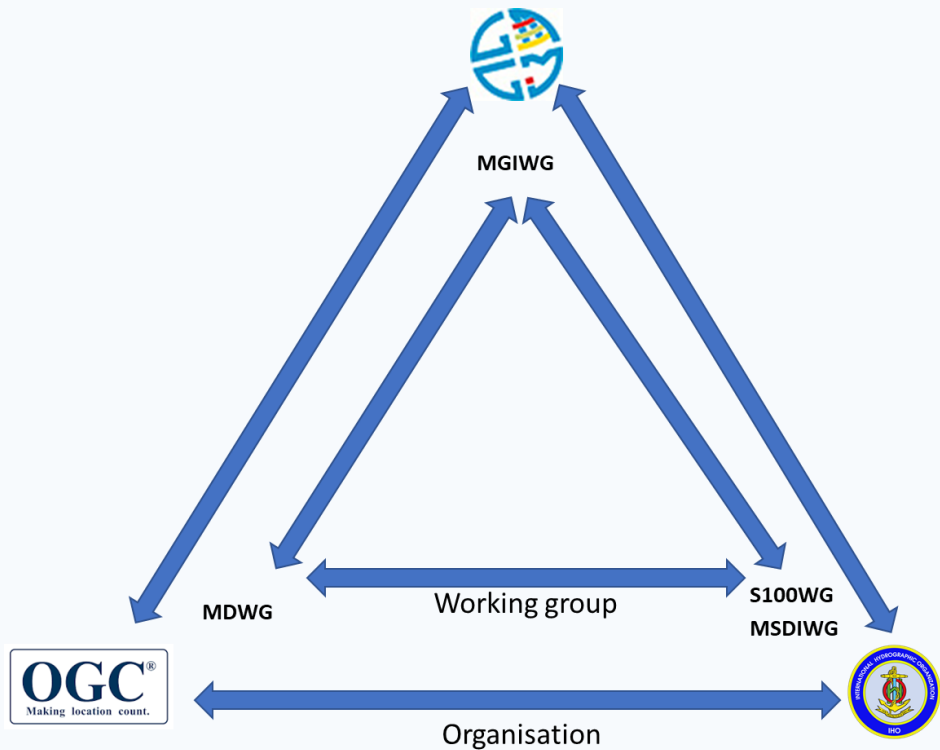


Marine Domain Working Group meeting in Busan

- Harmonisation of outputs from Singapore Marine summit
 - Interoperability and discoverability, particularly for scientific data
 - Visualisation (and Symbology)
 - Coastal domain harmonization, particularly vertical datum (land, sea and tide)
 - Temporal Data in the marine domain
 - Storage and handling of variable resolution data
 - DGGS for data discovery and analysis
 - Models for governance and policy on data sharing
 - Interoperability and implementation of data catalogues. “to find everything relevant to my domain of interest”
 - Metadata for bathymetry
 - Security, provenance and authenticity
- 1st Review and update – Belgium, June, 2019



Busan UN-GGIM meeting



GEOSPATIAL STANDARDS 6

Why are standards important? 6

What is an “open standard”? 6

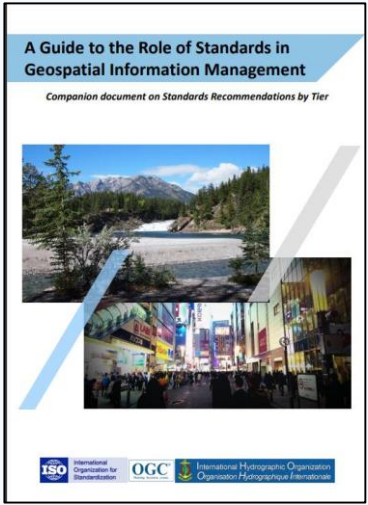
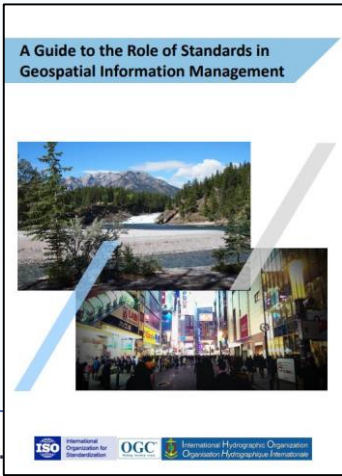
How are standards developed? 7

Key types of geospatial standards 7

Key Standards Development Organizations for Geospatial Information 7

Why are Standards Valuable? 9

The Benefits of Open Geospatial Standards 10



- OGC, IHO and ISO collaboration, “Guide to the Role of Geospatial Standards and Technical”, adopted "as *the international geospatial standards best practice for spatial data infrastructure*"
- Proposal: create a refined version from an MSDI/Marine viewpoint, “A Guide to the Use of Geospatial Standards in the Marine Domain”



Action requested of HSSC

- **Note this presentation**
- **Encourage member state participation in OGC TC meetings and Marine Domain Working Group to further knowledge exchange**

