Mastering Maritime Efficiency

The S-131 data model and potential for encoding of relevant Port information

- Background
- MHI Product Specification
- MHI Data model
- MHI Testbed

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The DYNAPORT project – webinar: Digitalizing Nautical Communication Between Ship and Shore with S-100.

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- ❑ Mikus has been in the Nautical chart production since 2007, and from 2008 has been leading the Nautical Charting division in the Maritime Administration of Latvia Hydrographic Service overseeing all navigational Nautical publication production. Have been working also in Hydrographic offices of New Zealand and Denmark covering various positions and projects. From 2022 employed by Electronic Chart Centre (ECC) working as Senior Geodata Consultant with the tasks covering data validation, standardization and various projects. Mikus has been involved in various IHO standardization Working Groups since 2008 on behalf of the employing institution. Mikus is a Chartered Marine Technologist and a member of IMarEST since 2018.

Why S-131

DYNAMIC NAVIGATION AND PORT CALL OPTIMISATION IN REAL TIME
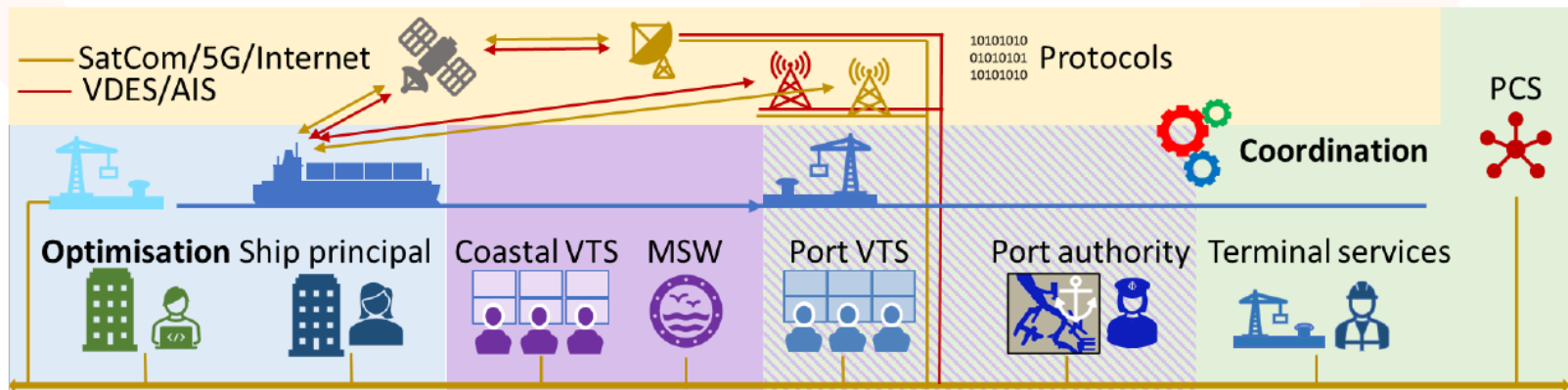
"… Only official Nautical Publications fulfill SOLAS carriage requirements; unofficial Nautical Publications don't. …" Port Information Manual for nautical data, v.1.1, 2022

Background

- Ongoing discussions since 2005 (IHO SNPWG/NIPWG).
  - International PORTCDM Council.
  - Port Manual information (2019) IHMA.
- NIPWG work on S-131 started 2020 (Commissioned by HSSC).
- WG participants:
  - IHO Member States
  - Industry (Port of Rotterdam)
  - Academia (UNH)
- Published edition: 1.0, March 2023 *(for testing and implementation purposes)*

INTERNATIONAL HYDROGRAPHIC ORGANIZATION

ASSEMBLY

FINANCE COMMITTEE — SECRETARIAT — COUNCIL

Hydrographic Services and Standards (HSSC)
- S-100 Working Group (S-100WG)
- ENC Standards Maintenance Working Group (ENCWG)
- Nautical Cartography Working Group (NCWG)
- Nautical Information Provision WG (NIPWG)
- Data Quality Working Group (DQWG)
- Tides, Water Level and Currents WG (TWCWG)
- Hydrographic Dictionary WG (HDWG)
- Advisory Board on the Law of the Sea (ABLOS)
- Hydrographic Surveys WG (HSWG)

Inter-Regional Coordination Committee (IRCC)
- Regional Hydrographic Commissions (RHCs)
- Hydrographic Commission on Antarctica (HCA)
- Sub-Committee on World-Wide Navigational Warning Service (WWNWS-SC)
- Capacity Building Sub-Committee (CBSC)
- Worldwide ENC Database WG (WENDWG)
- Marine Spatial Data Infrastructures (MSDIWG)
- IHO-EU Network Working Group (IENWG)
- Crowdsourced Bathymetry WG (CSBWG)
- INT Board on Standards of Competence (IBSC)

S-131 Marine Harbour Infrastructure (MHI)

- S-131 is an S-100 standard based Product Specification (PS):
    - allows the content, the content definition (Feature Catalogues) and the presentation (Portrayal Catalogues) to be updateable without the implemented base system changes.
    - is a data product that can be used as a Nautical Publication Information Overlay (NPIO) within an Electronic Chart Display and Information Systems (ECDIS) or any other S-100 based marine navigation or shore-based systems.
    - is a vector (GML) product specification intended for encoding information relating to port and harbour facilities for facilitating berth-to-berth navigation.

S-131 Marine Harbour Infrastructure (MHI) (cont.)

- ○ allows to encode the layout of ports and the availability of port services - facility locations, service areas, services offered, contact details.
- ○ is intended to be as a supplement to ENC (in ECDIS).
- ○ is built taking into account the Port Information Manual for Nautical Data of BIMCO, IAPH, IHMA, IHO, ITPCO
- ○ as independent dataset is also useful for shipping companies, brokers and other in the industry to optimize their planning.

- The Marine Harbour Infrastructure describes relevant data on **harbour infrastructure**, **facilities**, **services** and **regulations** in a standardized form.

S-131 Data or DB Scope

- Traditional harbour component of Sailing Directions/Coast, as well with IMO Resolutions A.893(21) berth to berth navigation and A.862(20) recommended contents in port information books
- From local fishing harbours to mega ports
- Improve the information exchange between harbours, hydrographic offices and end users by acting as a neutral repository of harbour information

Nautical data
a) Port depths and water levels
b) Port infrastructure
c) Port information

Operational data
a) Arrival / Departure times at berth and pilot boarding place
b) Starting / Completion times of vessel and cargo services

Administrative data
a) IMO FAL forms data
b) IMO Port facility number

S-131 Data modeling
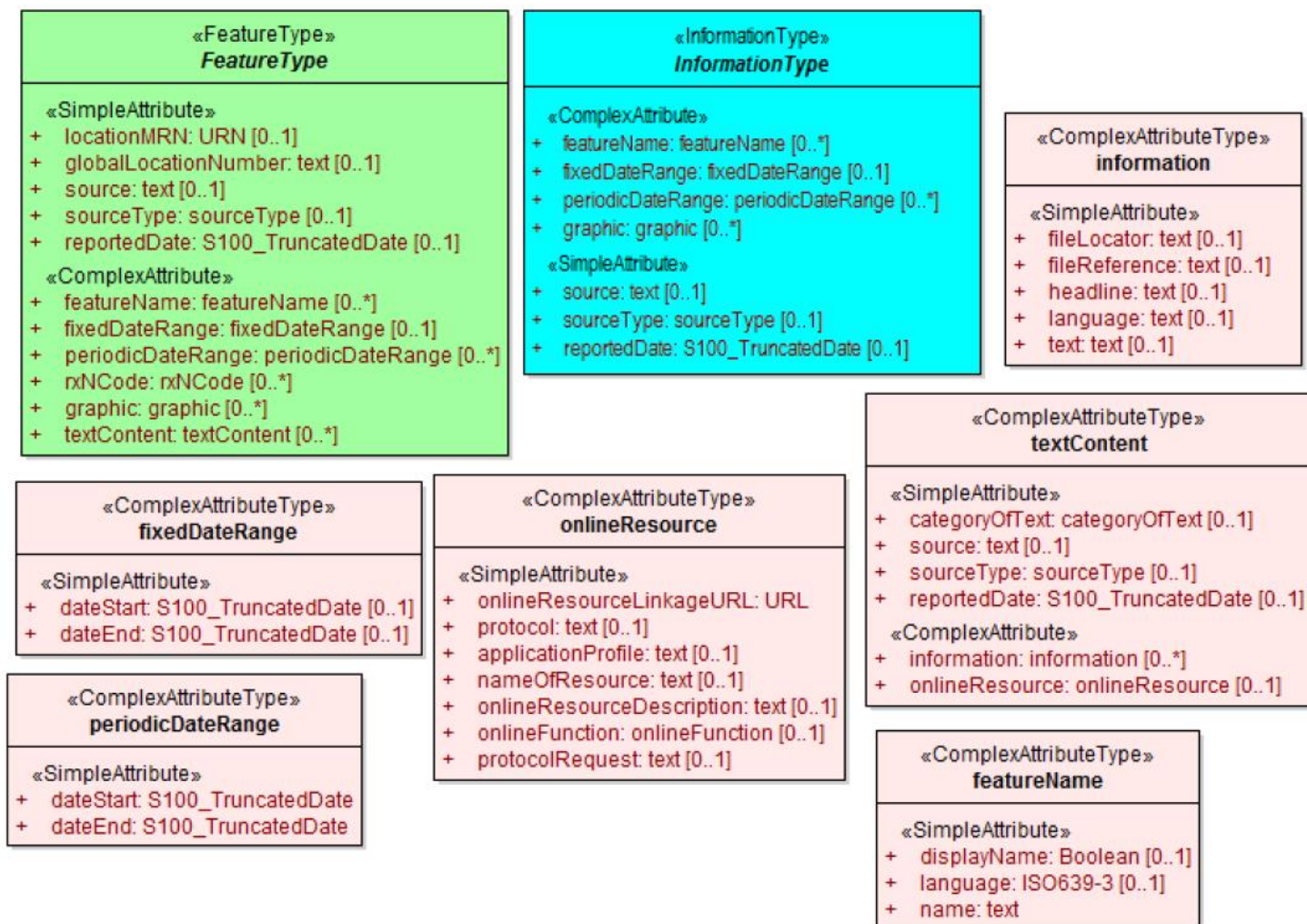
Figure 4.2 - Base classes in S-131

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Attribute inheritance type model

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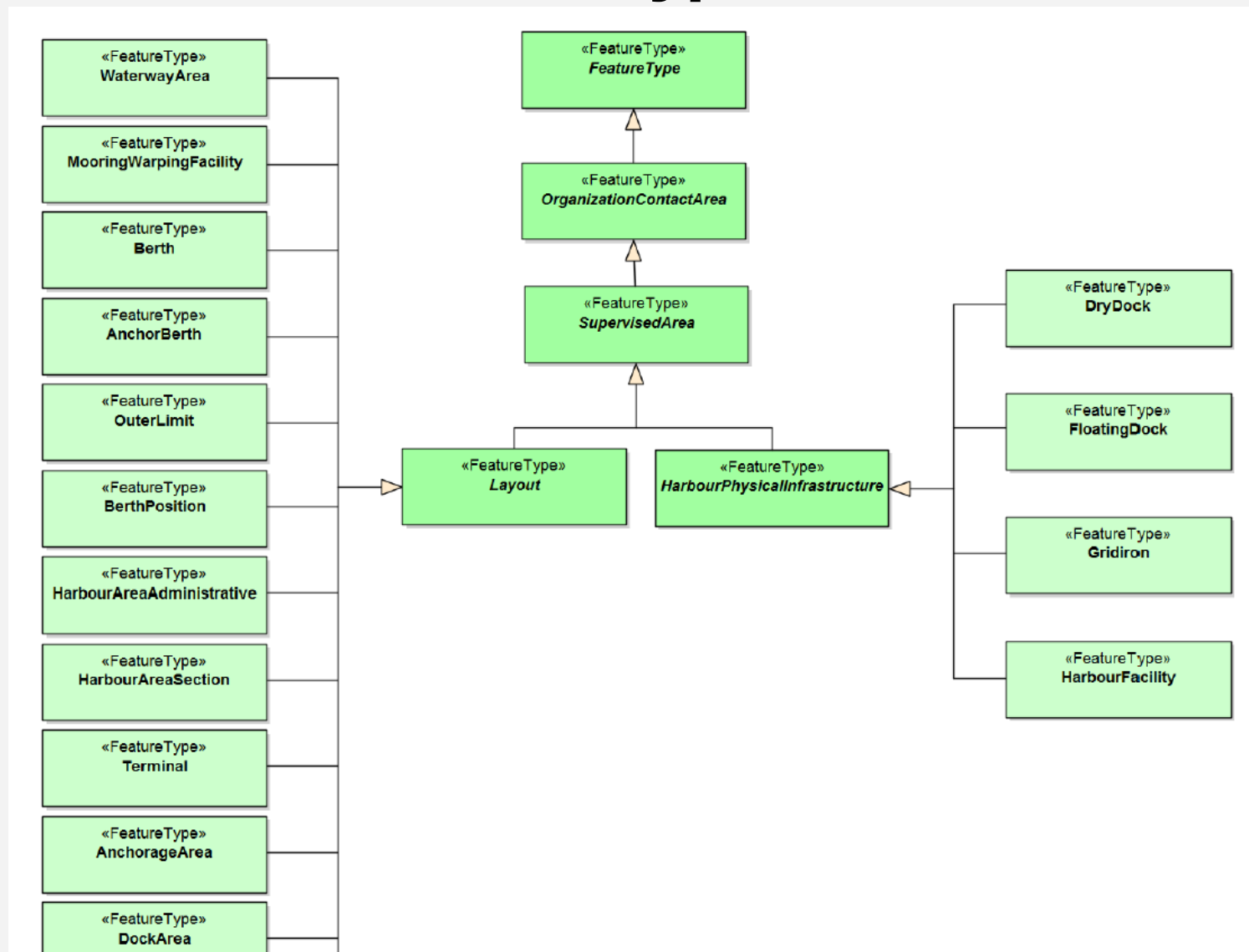
Attribute inheritance type model
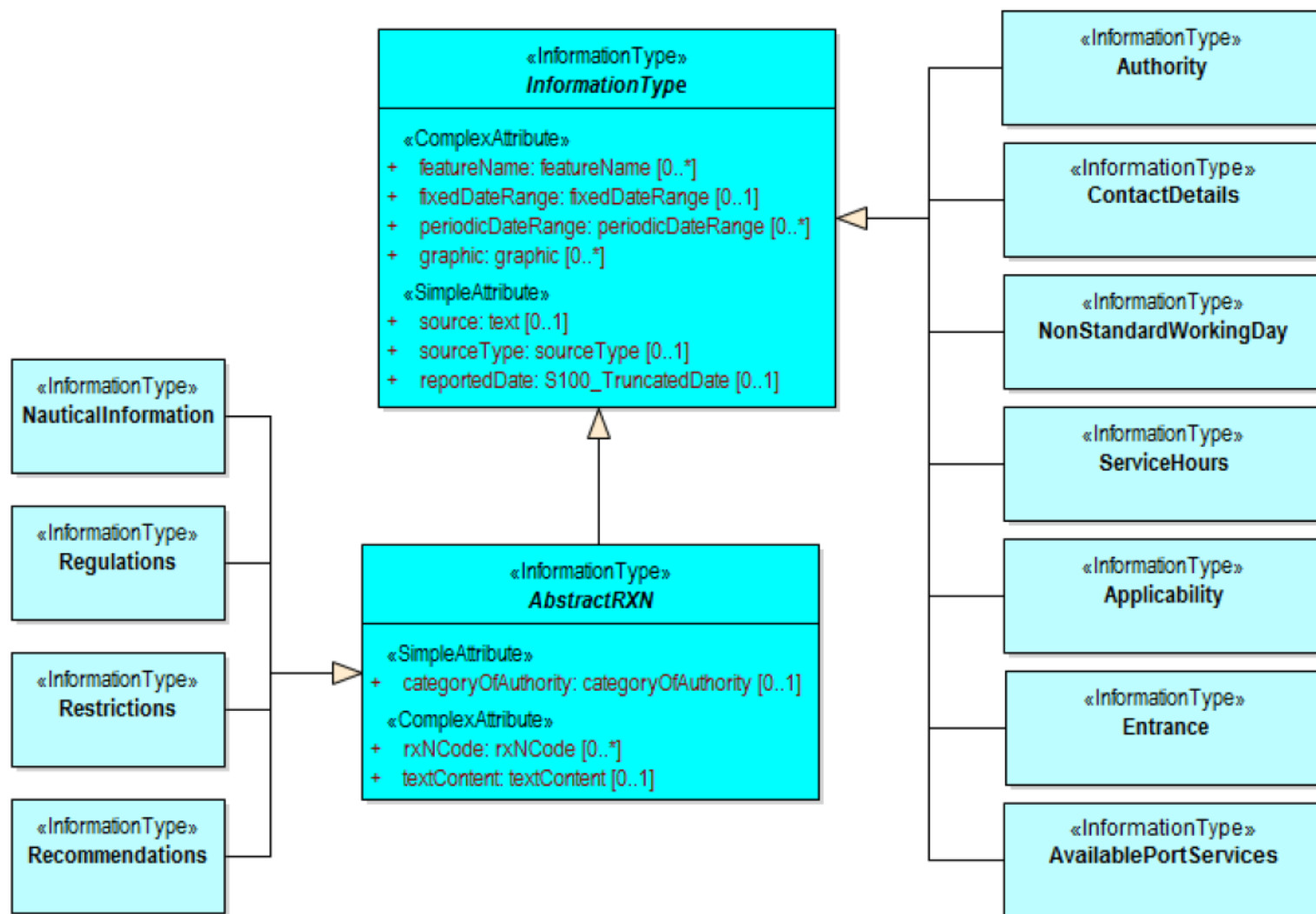
Data modeling examples - Associations

Figure 4.9 - Port services

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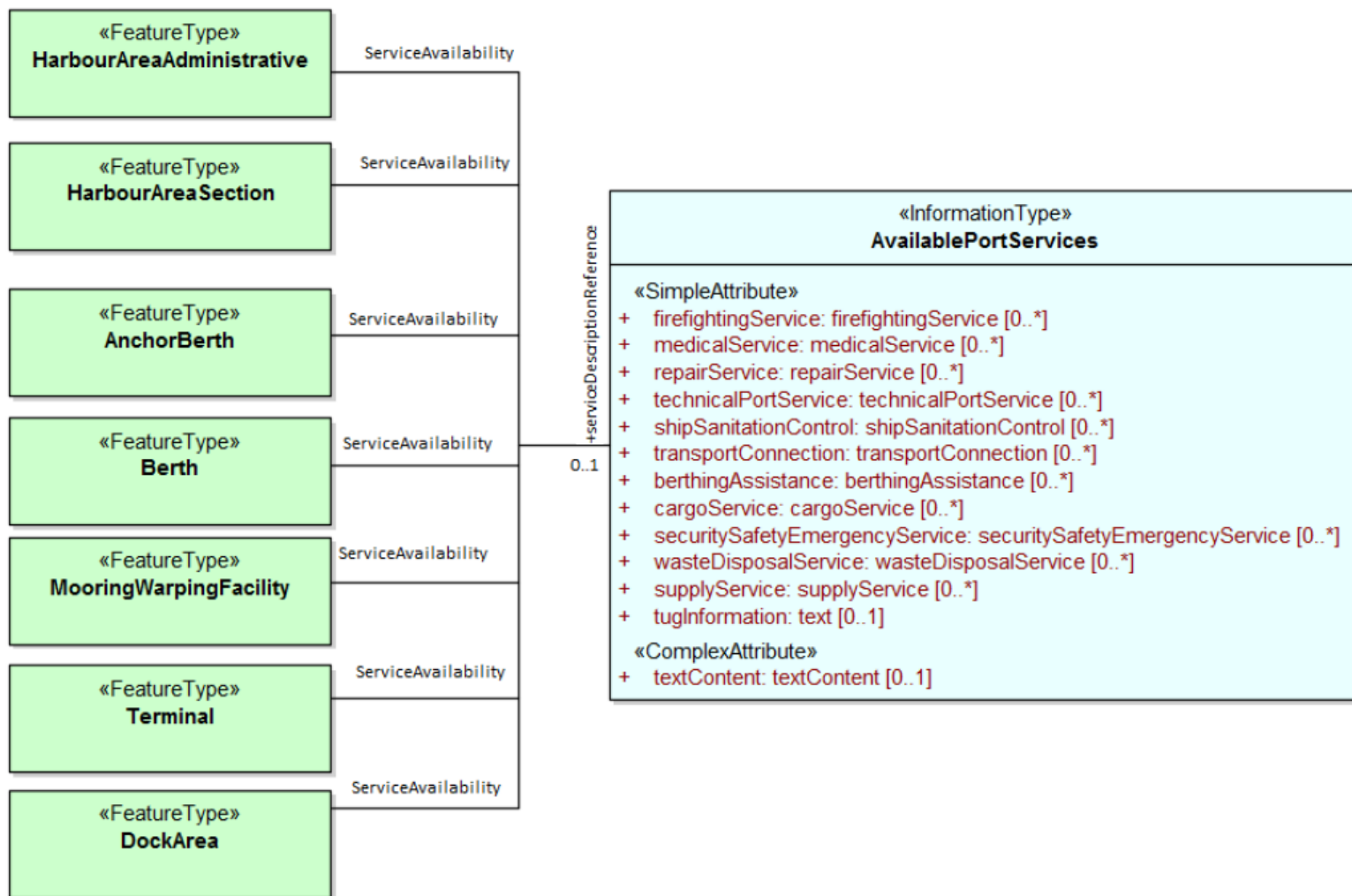
Data modeling examples - Associations
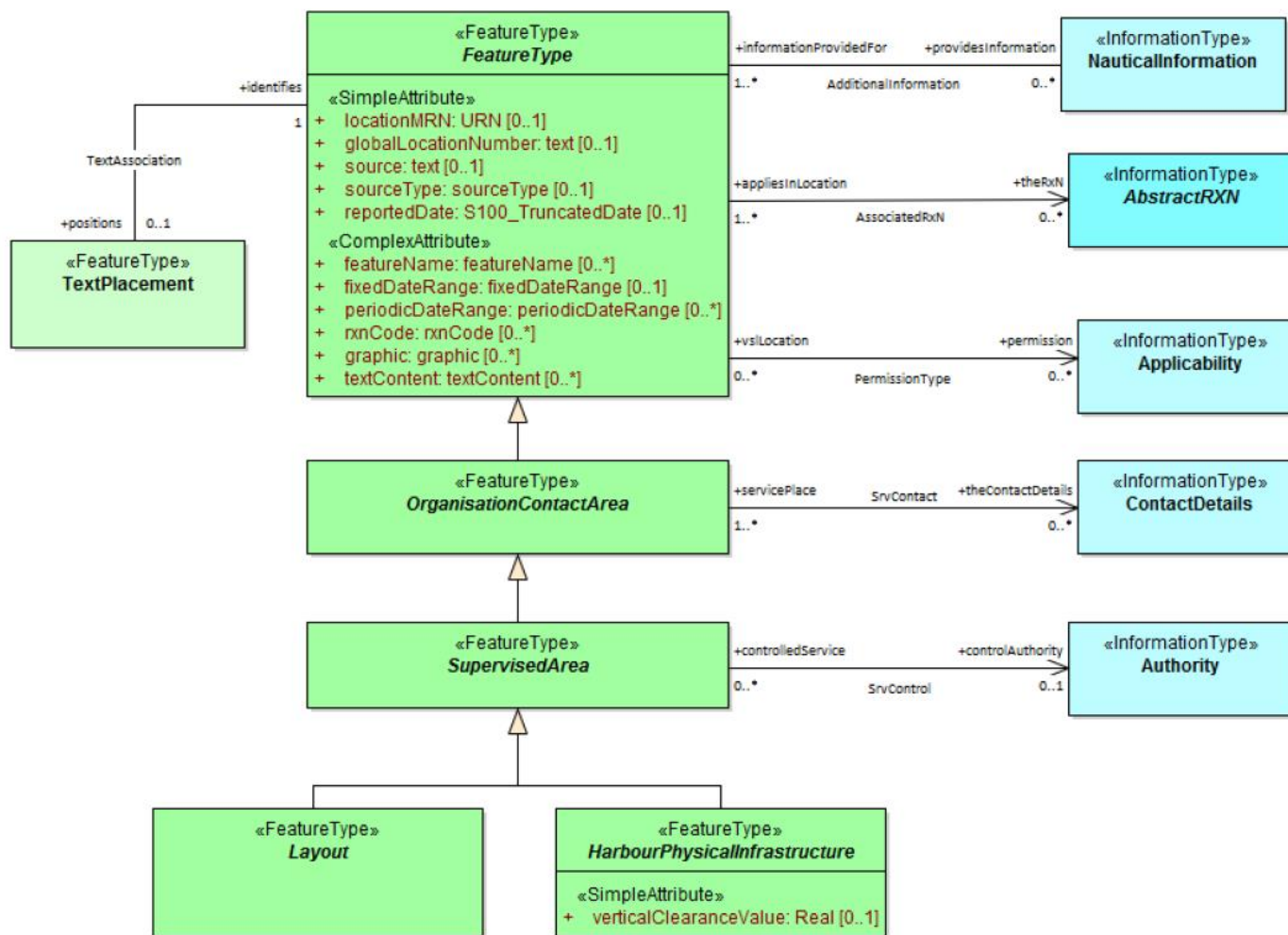
Figure 5.1 - Abstract feature types and their relationships

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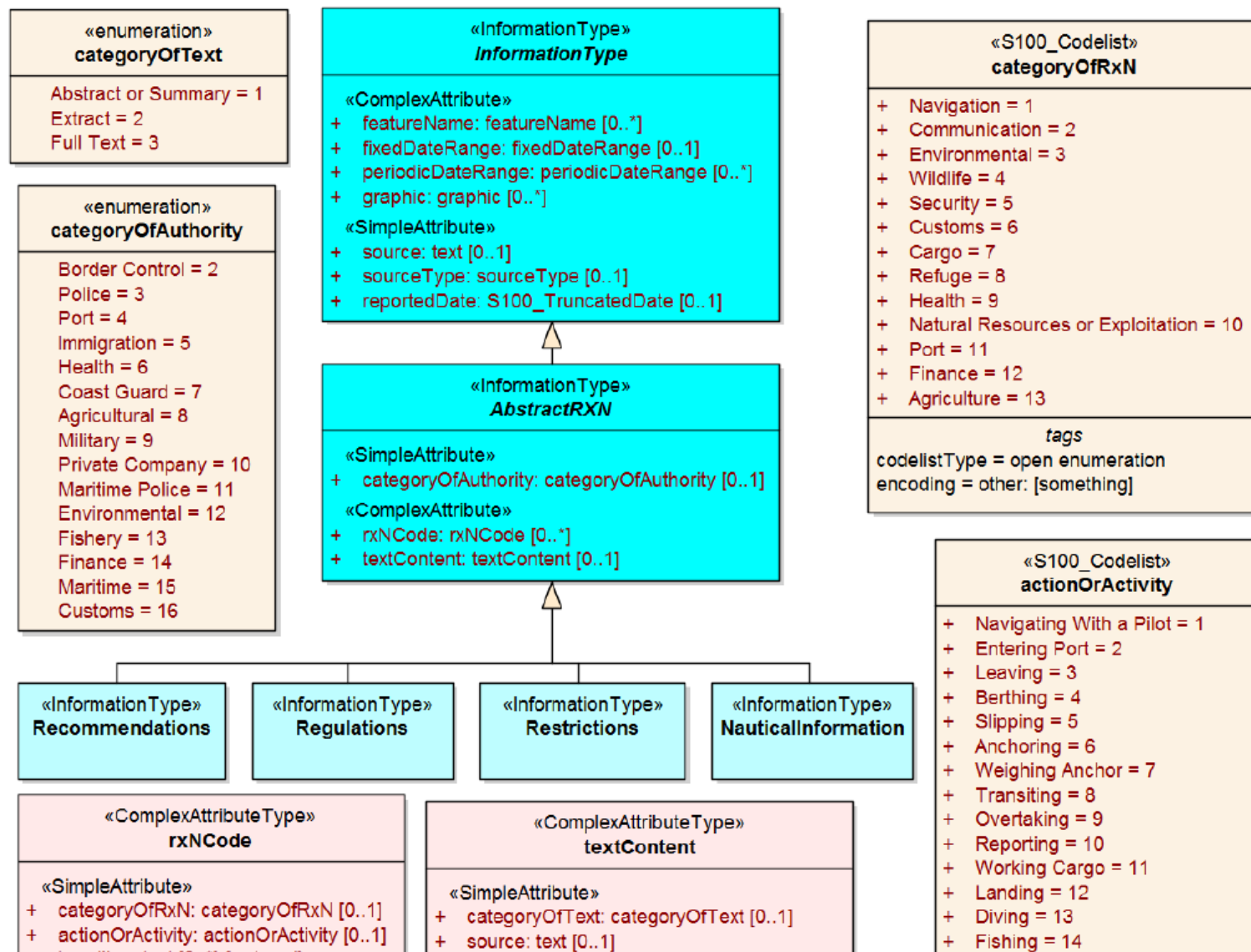
Data modeling examples - Associations

Data modeling examples - Associations

Some Feature type examples
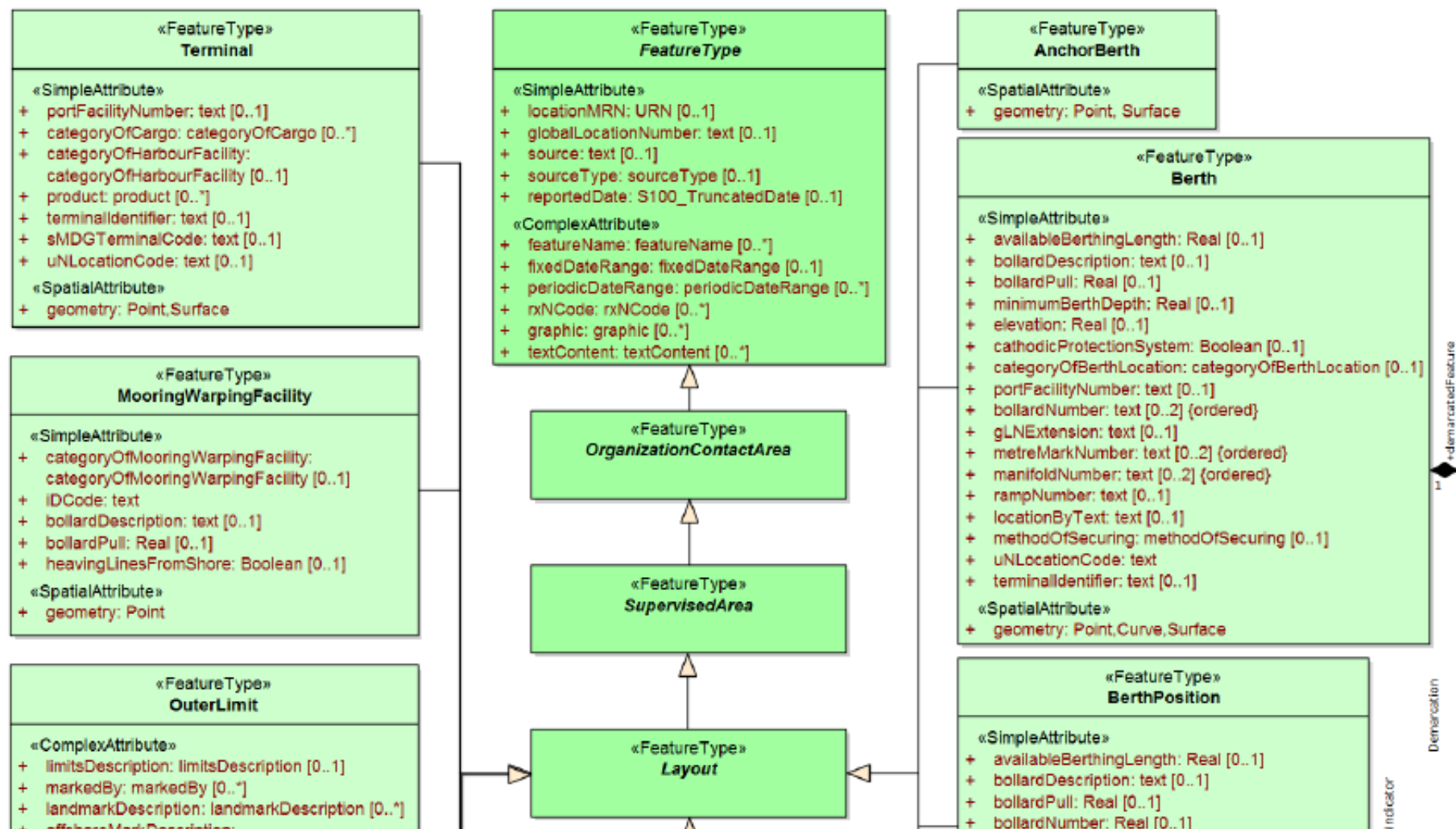
Information type example - Regulations

Information type example Contact details

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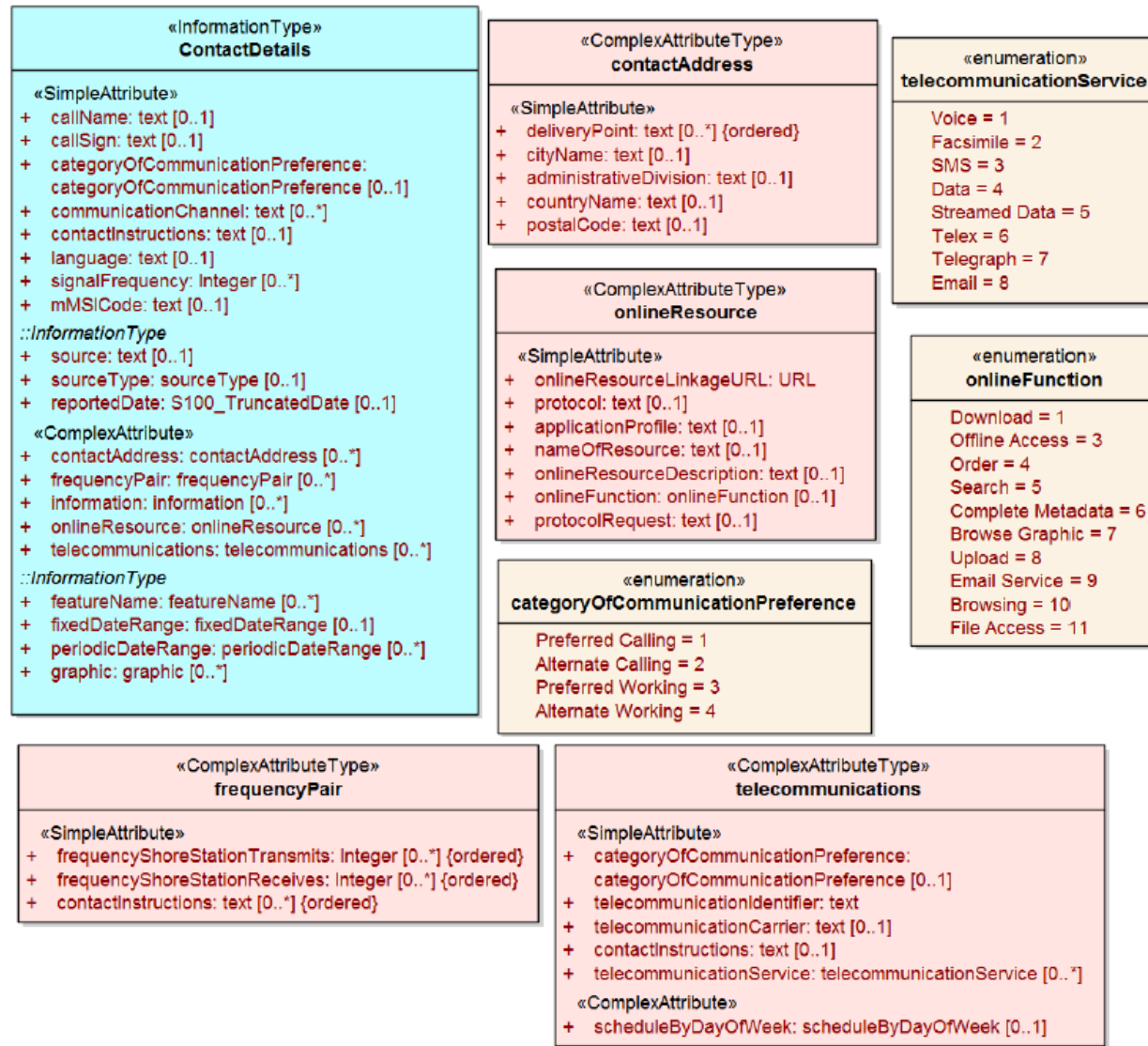
Information type example Contact details
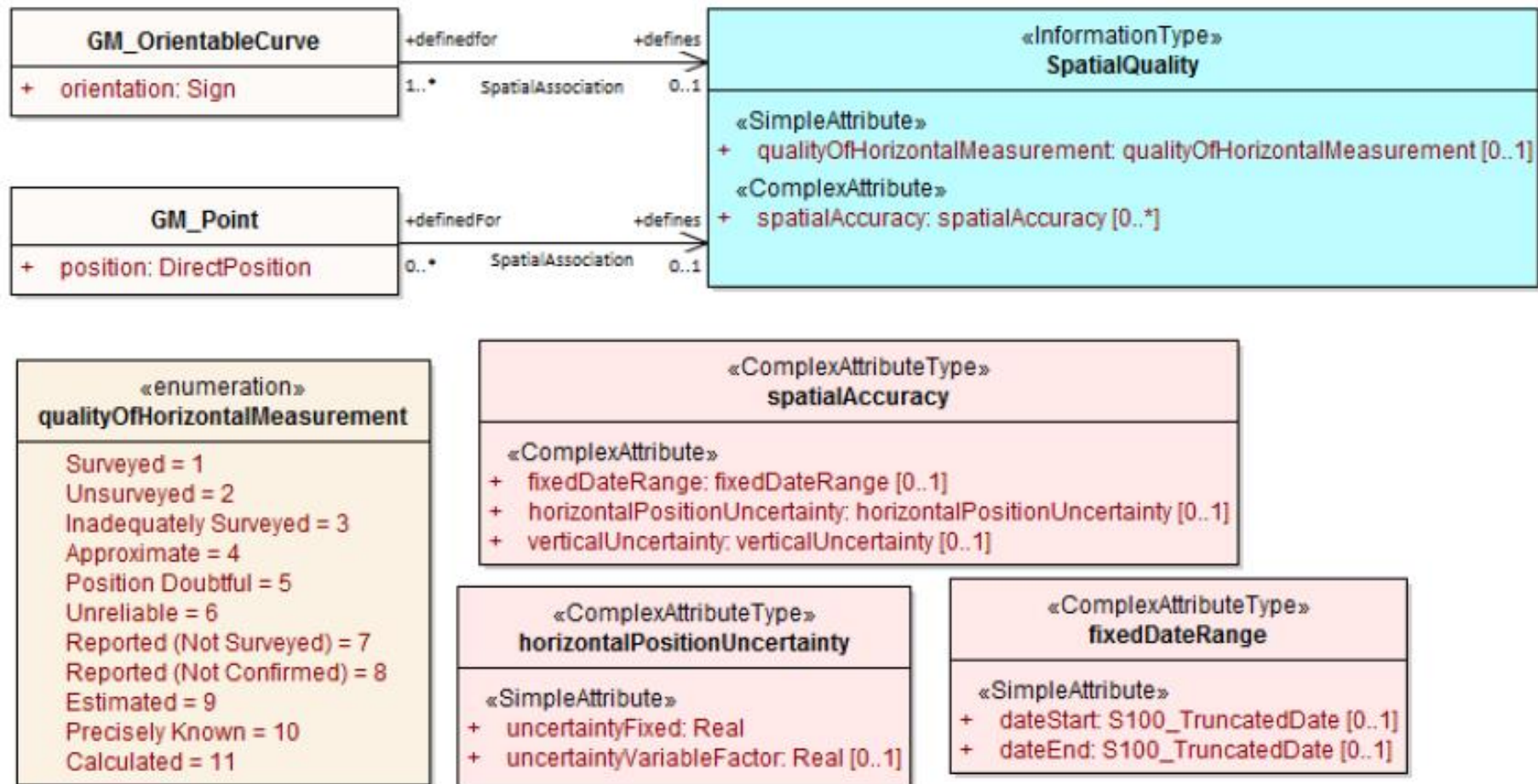
Attributes as Codelists
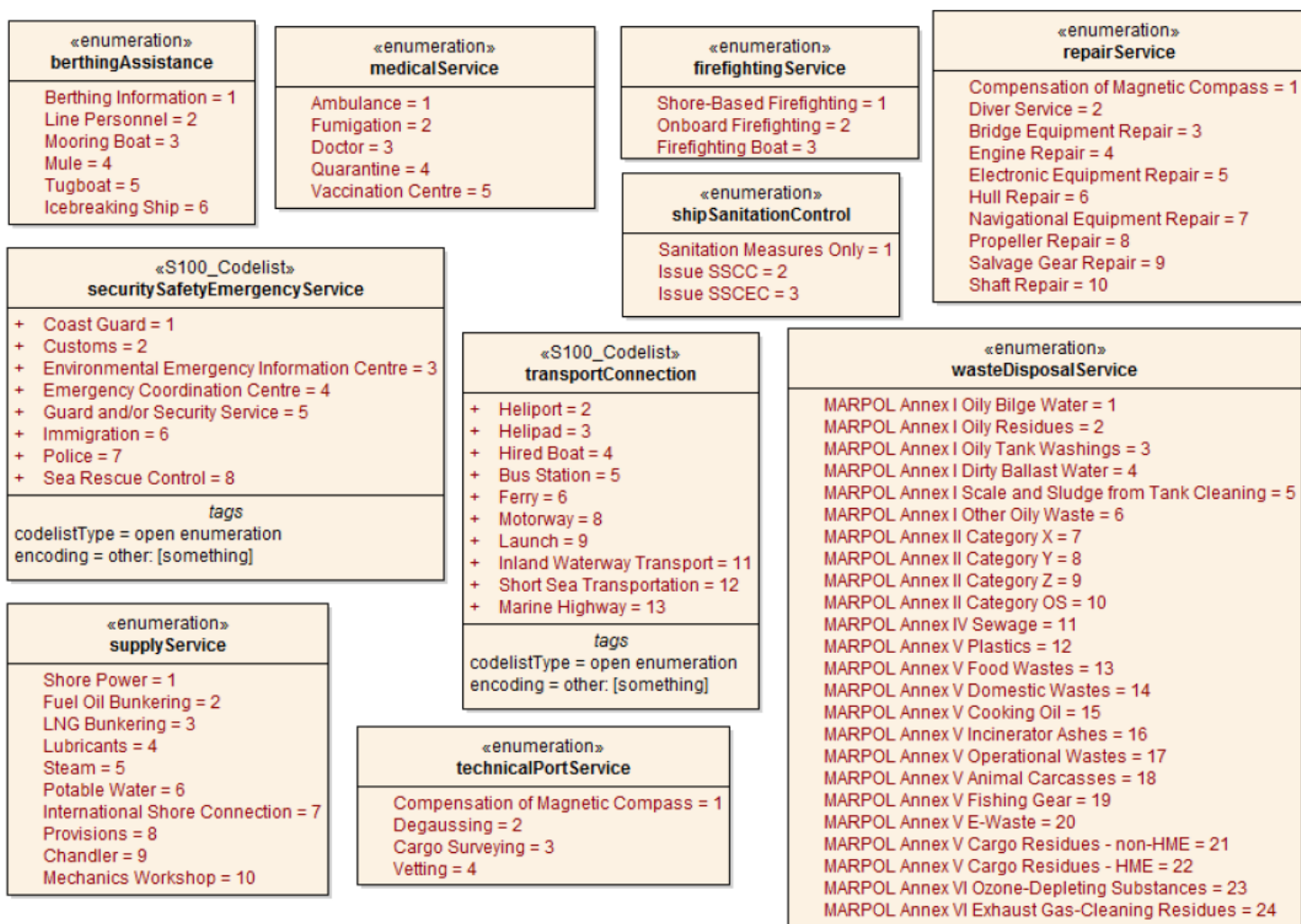
Figure 4.10 - Service enumerations and codelists

IHO S-131 Testbed

On going

Paper specs are not sufficient.

Digital test-bed or public software is needed

Operational: API with Clarkson, MarineTraffic (Keppler), ISS

On 26/10/23 meeting re. API for S-131 testing with IHO

Investment API: less than building an app or a website

Initial testing Q1 2024

Initial demo Q2 2024

Between two trusted parties, digital corridor

Next step is how to connect 8000 ports – July 3 2024

**Navigating the S100 World**

S-131

- S-131: Marine Harbour Infrastructure
- Dual purpose:
  - assisting data exchange
  - distribution to end users
- Development underway by S-131 project team under the IHO Lab

Canadian Hydrographic Service – Service hydrographique du Canada

Canadä

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Classification: Public

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Marine Harbour Infrastructure Database

- **Ports face difficulties when gathering data from all data owners in the port;** as the port authority is not data owner of all port data (e.g, terminals may be the data owner of the soundings of the berthing pocket).
- Marine Harbour Infrastructure database will facilitate the information exchange between harbours and HOs.
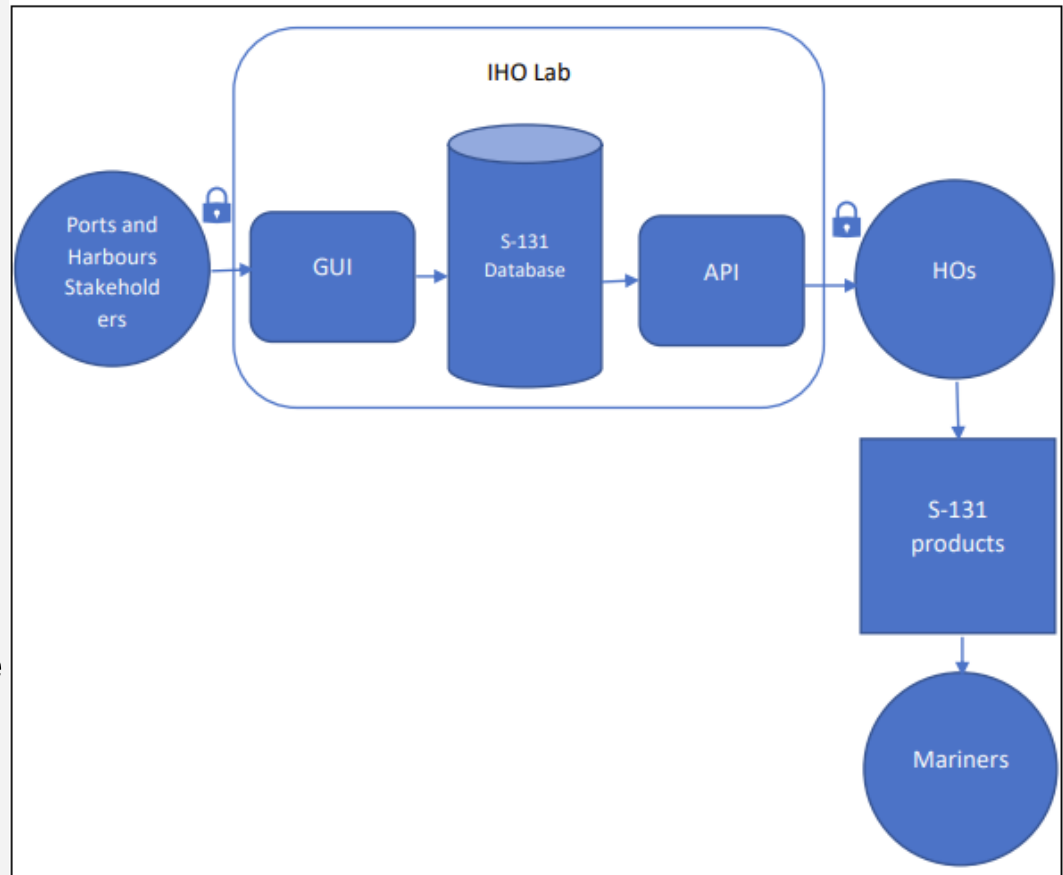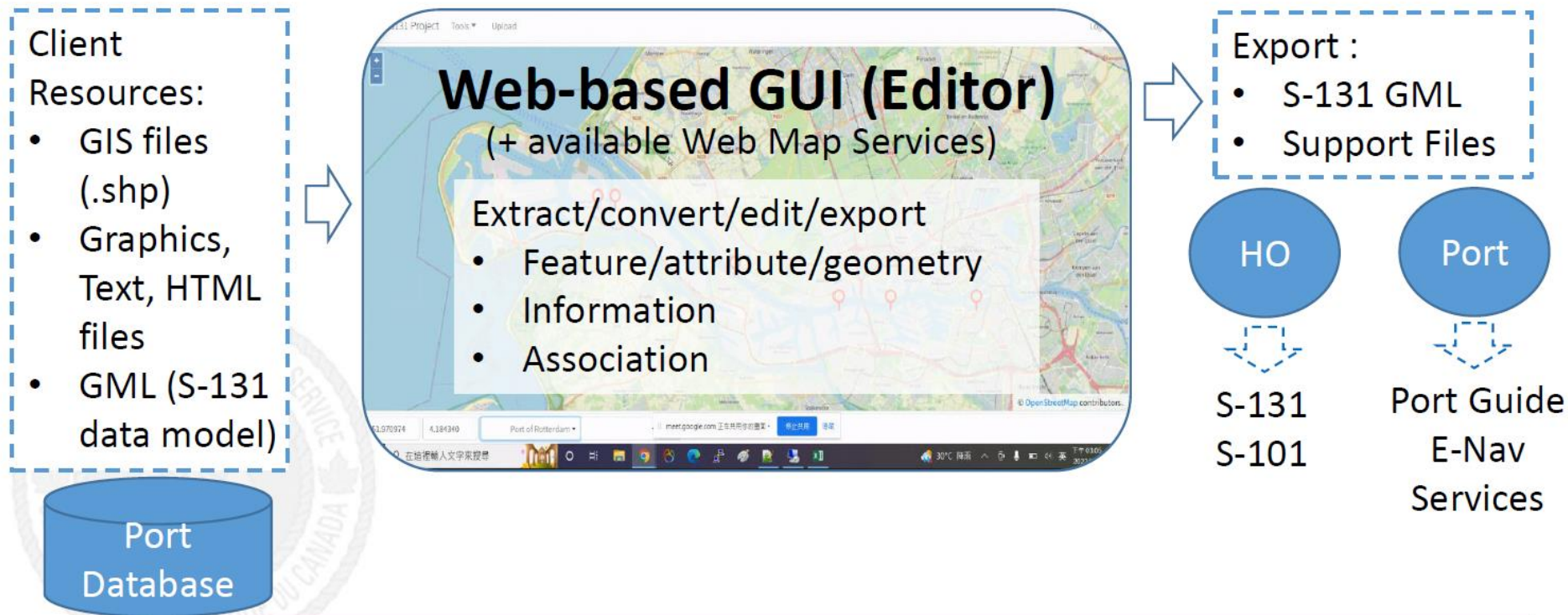
Visible & Interoperable Port Database

- S-131 Marine Harbour Infrastructure Database Project is the IHO-Singapore Innovation and Technology Lab Project https://iho.int/en/projects.

- **Create a S-131 database infrastructure and a database** that will improve the information exchange between harbours and hydrographic offices by acting as a neutral repository of harbour information

- **Facilitate the exchange of information between harbours, HOs and port users**(e.g., mariners, shipping lines, trading floors) compliant with the S-101 and S-131standards

Visible & Interoperable Port Database

- **Support the creation of S-131 (and S-101 ENC) products** that help ports and shipping to be compliant with IMO A.893(21): safe berth to berth navigation and IMOA.862(20): recommended contents of port information books.

- Demonstrating that Hydrographic Offices and Port Authorities have worked together to discharge their collective SOLAS responsibilities as per Chapter V Regulation 9:Hydrographic Services.

Visible & Interoperable Port Database

- Collaborative effort, Server: IHO Lab, Back end: IIC. GUI: NTOU, Feature Catalogue: Portolan Sciences, API – tbd(Swagger), Hydrographic offices (Canada, Norway, MPA, etc)

https://www.port-data.net/s131/S-131 GUI UserGuide.htm

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www.port-data.net

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Default Port Database Resources

- There are three layers/default resources:

  - Port Unlocode extracted from UN locationCode database and combined with NGA's World Port Index data;

  - SMDG Terminal Code retrieved from SMDG.org

  - ISPS port facility extracted from IMO's GISIS

  - … and potentially others as agreed or required

Port Database functionality examples

Earlier identified testbed challenges

- Identity management – Maritime Connectivity Platform? Who is the authority?

- Establishing good information flow between ports and hydrographic offices

- Ports and terminal operators: source providers; hydrographic offices to develop and maintain?

- How to cultivate relationships with ports?

Underway and Next

- DB population

- Testing; data model v1.1

- Port users adding the data

- Port feedback

- National databases conversion/import options testing

- The tools code management for IHO at GitHub

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- **Questions and discussions**

- Additional resources

  - [S-131 Marine harbour Infrastructure – AEGIS](#) (Earlier ECC presentation)

  - https://www.port-data.net/s131/ (IHO Lab S-131 Project tool)

  - [S-131   Marine Harbour Infrastructure](#) (IHO GI REGISTRY)

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