

Ocean Big Data

The power of combining
dataspaces and artificial
intelligence demonstrated by
Marispace-X and Fish-X

Our mission is to continuously advance people's ability to access, visualise, and use their ocean and geospatial data.



Founded in 2019



Ocean Big Data Specialists



+65 employees

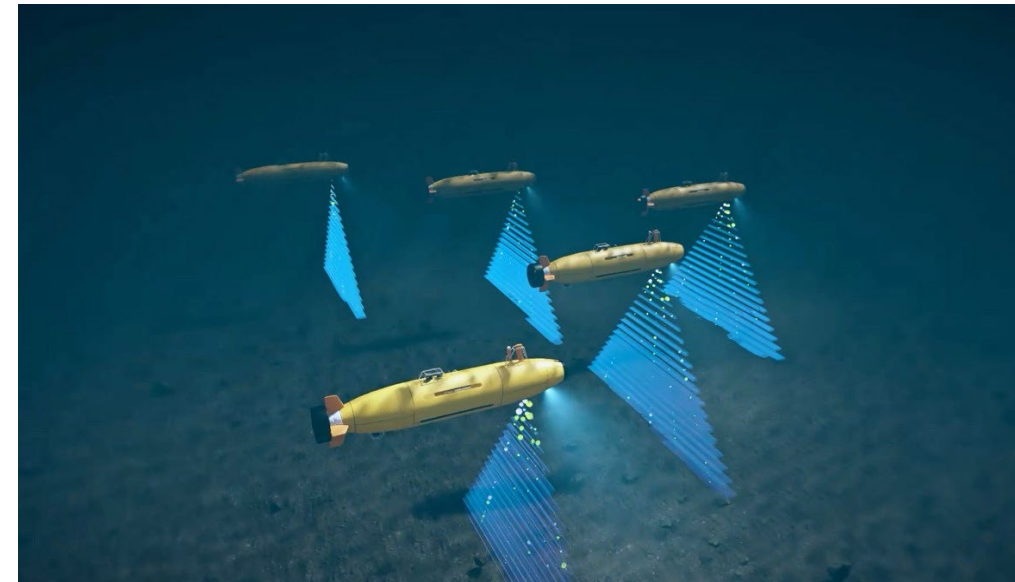


Megatrends



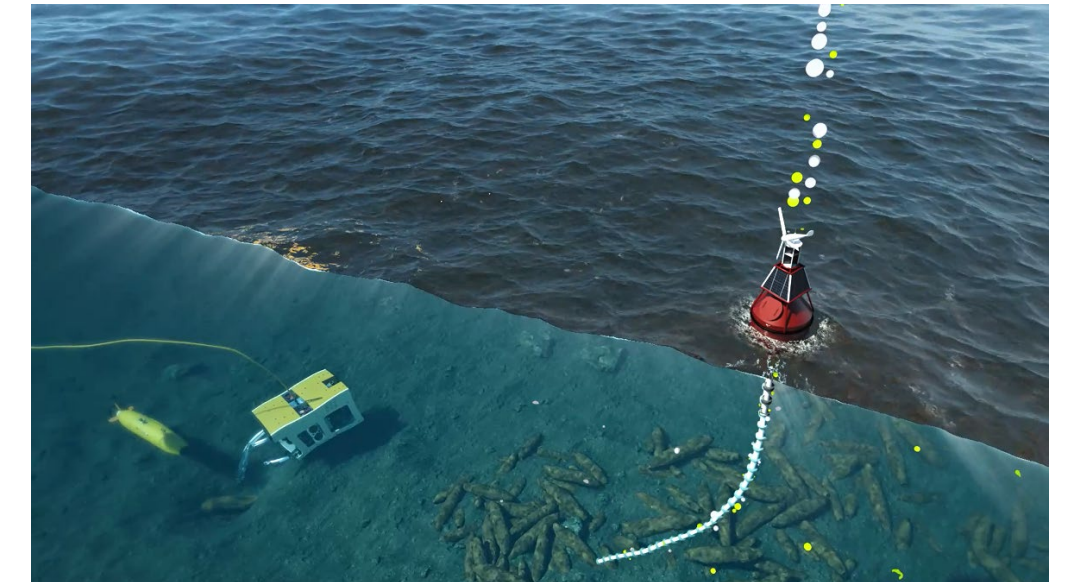
Industrialisation

Expansion of renewable energies, infrastructure and ocean usage



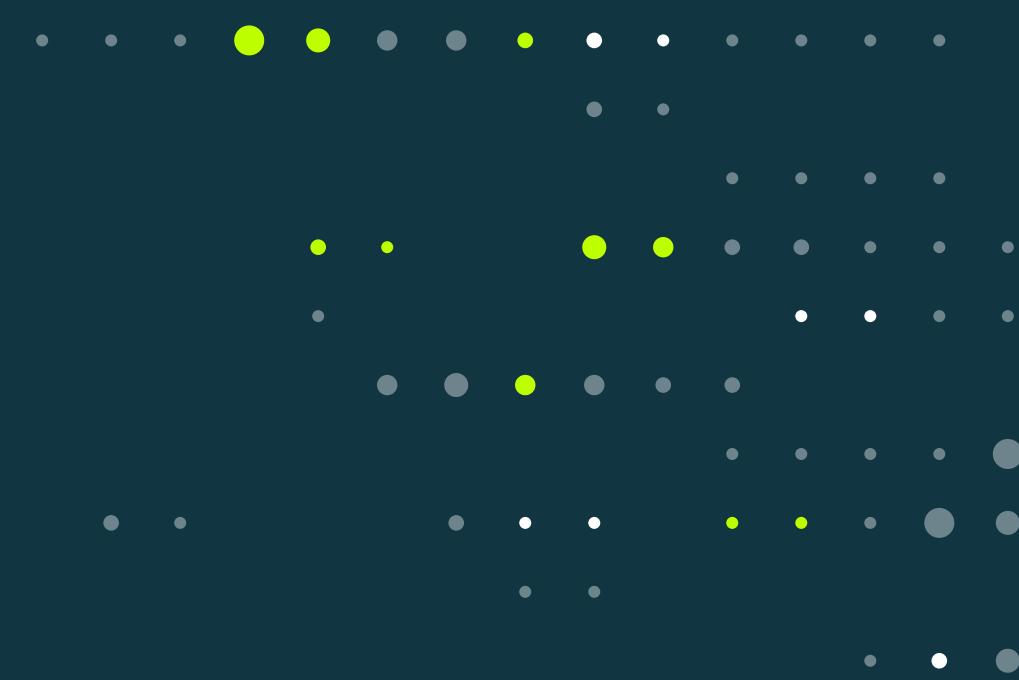
Autonomy

Autonomous ships, new generations of sensors and high resolution data



Connectivity

Connectivity increases which allows data flows and application of new technologies



Dataspaces

Marispace-X / Fish-X



GAIA-X

The Concept

Gaia-X represents the next generation of data infrastructure ecosystem: an open, transparent, and secure digital ecosystem, where data and services can be made available, collated and shared in an environment of trust.

The architecture of Gaia-X is based on the principle of decentralisation. Gaia-X is the result of many individual data owners (users) and technology players (providers) – all adopting a common standard of rules and control mechanisms – the Gaia-X standard.



Vision

Mission

Together we create an open, and secure federated digital ecosystem, where data and services respond to common rules and can be freely and securely built, collated, and shared

Vision

Digital platforms are becoming the digital twin of physical environmental, economic, political, and societal ecosystems. Our ability to ensure their respect of fundamental principles of freedom, transparency, and sovereignty, will determine the future of Europe and any civil society





Advanced Smart Services

(Cross-) Sector Innovations/ Market places/ Applications

Data Spaces

Interoperable & portable (Cross-) Sector data-sets and services

Gaia-X Federation Services

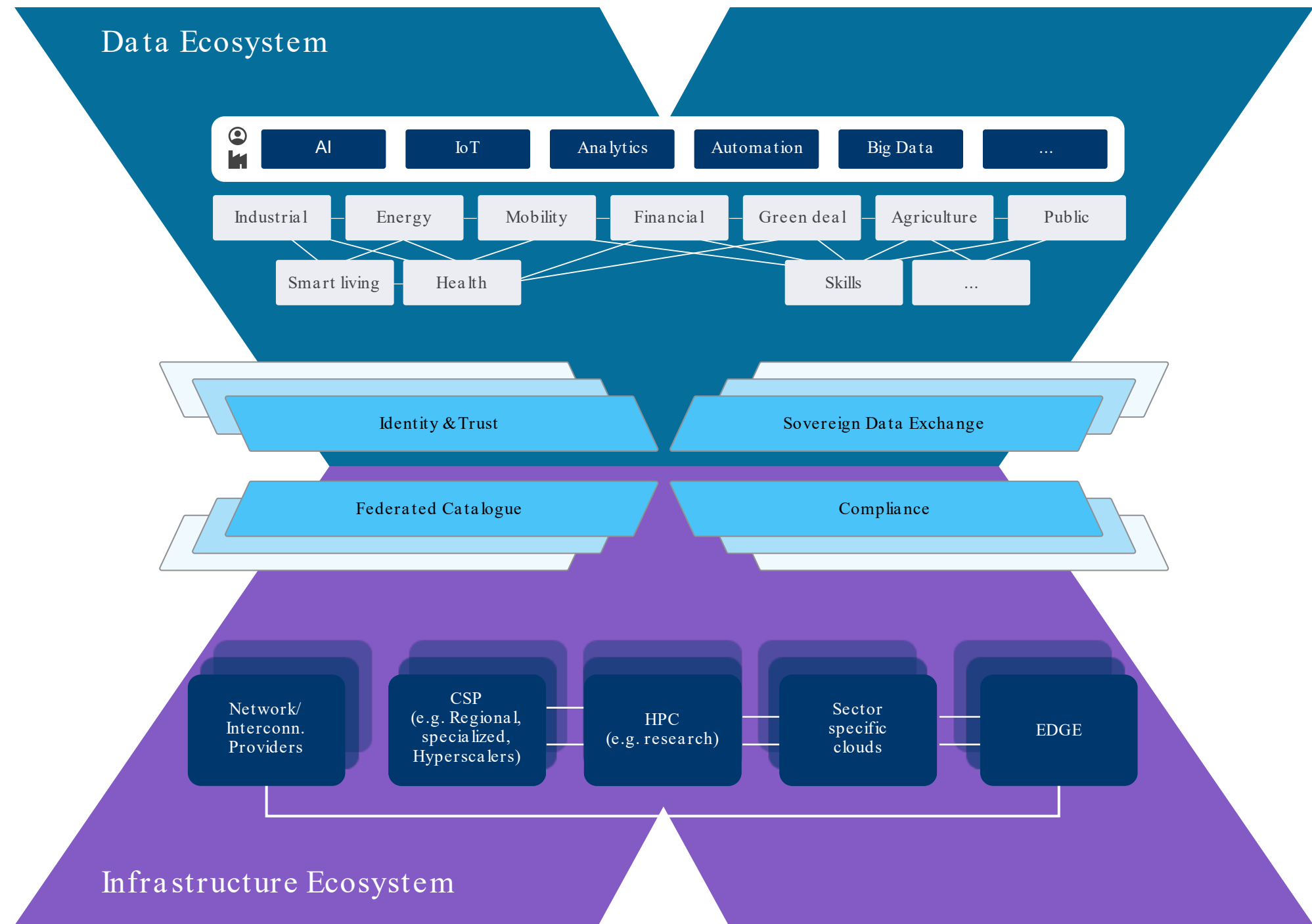
Federated & distributed for interoperability Trust & Sovereignty services.

Portability, Interoperability & interconnectivity

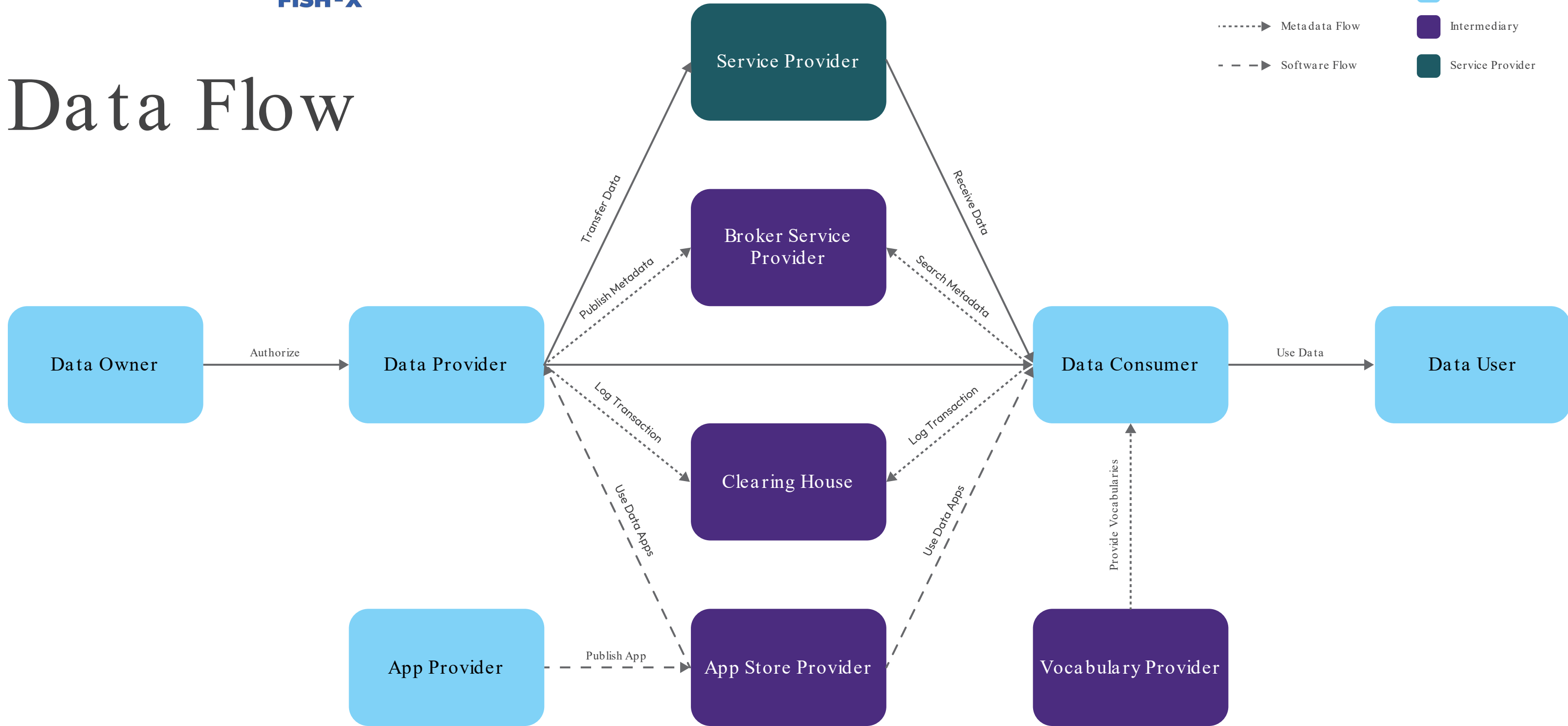
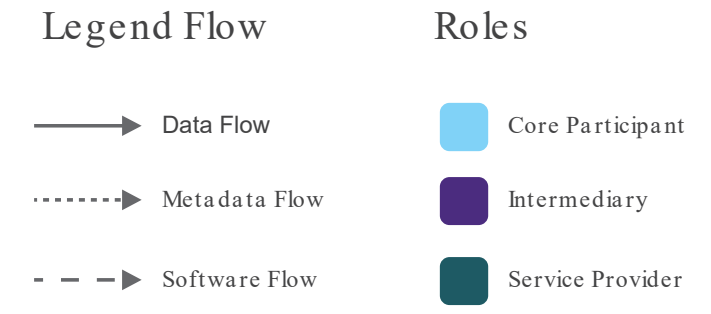
Technical: Architecture of Standards
Commercial: Policies

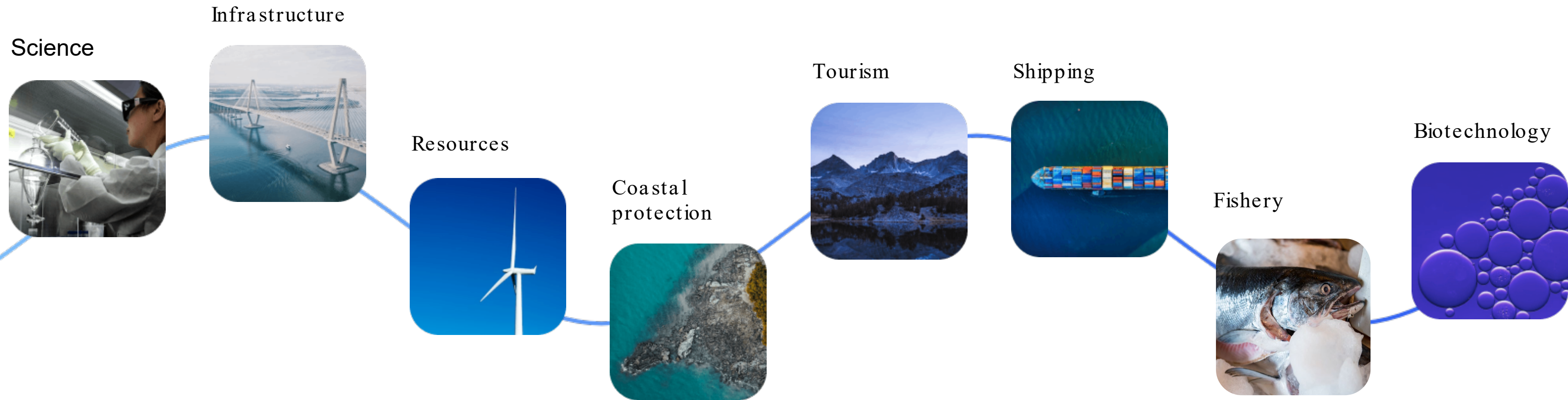
Compliance

Legal: Regulations

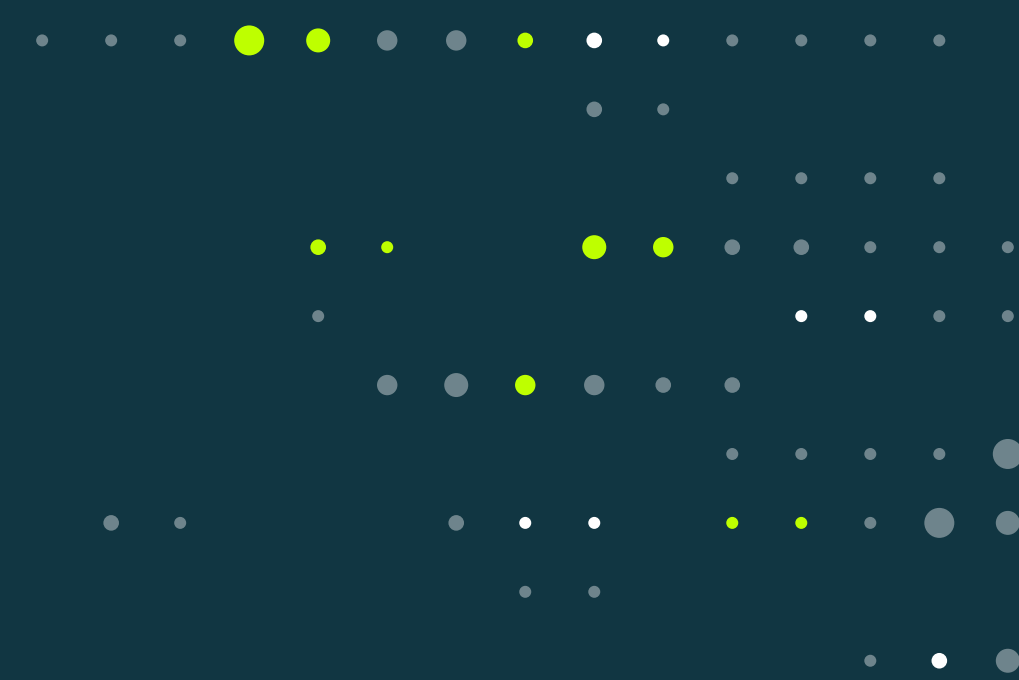


Data Flow





Blue Economy



Dataspaces

Data Challenges

Data availability

Challenge

- Underwater data is mainly collected on an ad hoc basis or in relation to specific topics
- Small scale fishery data is hard to acquire, maintain and needs high trust between the participants
- Lack of overview and access to existing data due to heterogeneity and stakeholders involved
- Maritime mass data is often inaccessible without metadata management on hard drives or server storage.

Data volume

Challenge

- Hydroacoustic underwater data quickly reach data volumes in the tera- and petabyte range
- Data for fishery comes from a multitude of sources with high volumes and complexity
- Analyses in spatio-temporal contexts require high computing power and big data computing technologies (GPUs).

Data storage and processing

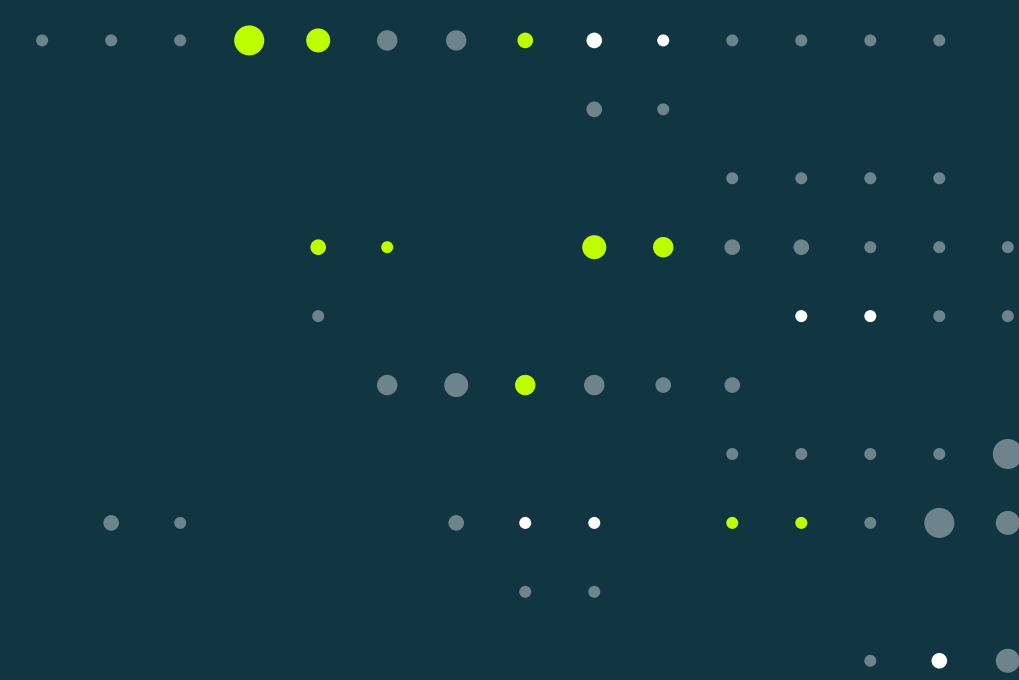
Challenge

- Intelligent handling of storage and processing of the enormous amounts of data generated in the maritime context
- Use of cloud computing and artificial intelligence for efficient data processing and analysis.

Data security

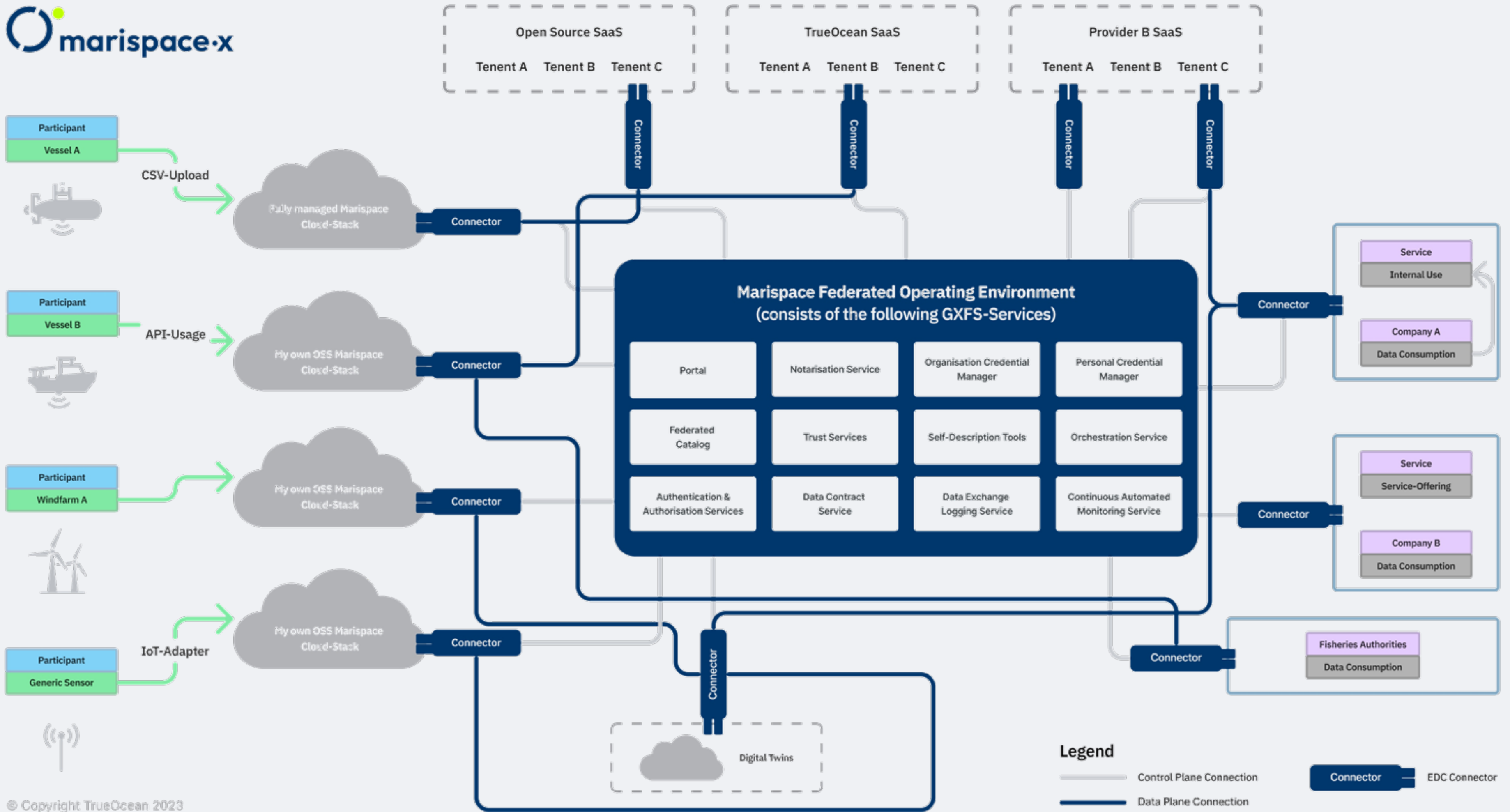
Challenge

- Underwater infrastructures are important for national security, so the protection of data is crucial
- Partially freely available high-resolution maritime mass data without regulated control of data access
- Personal data is of high sensitivity



Dataspaces

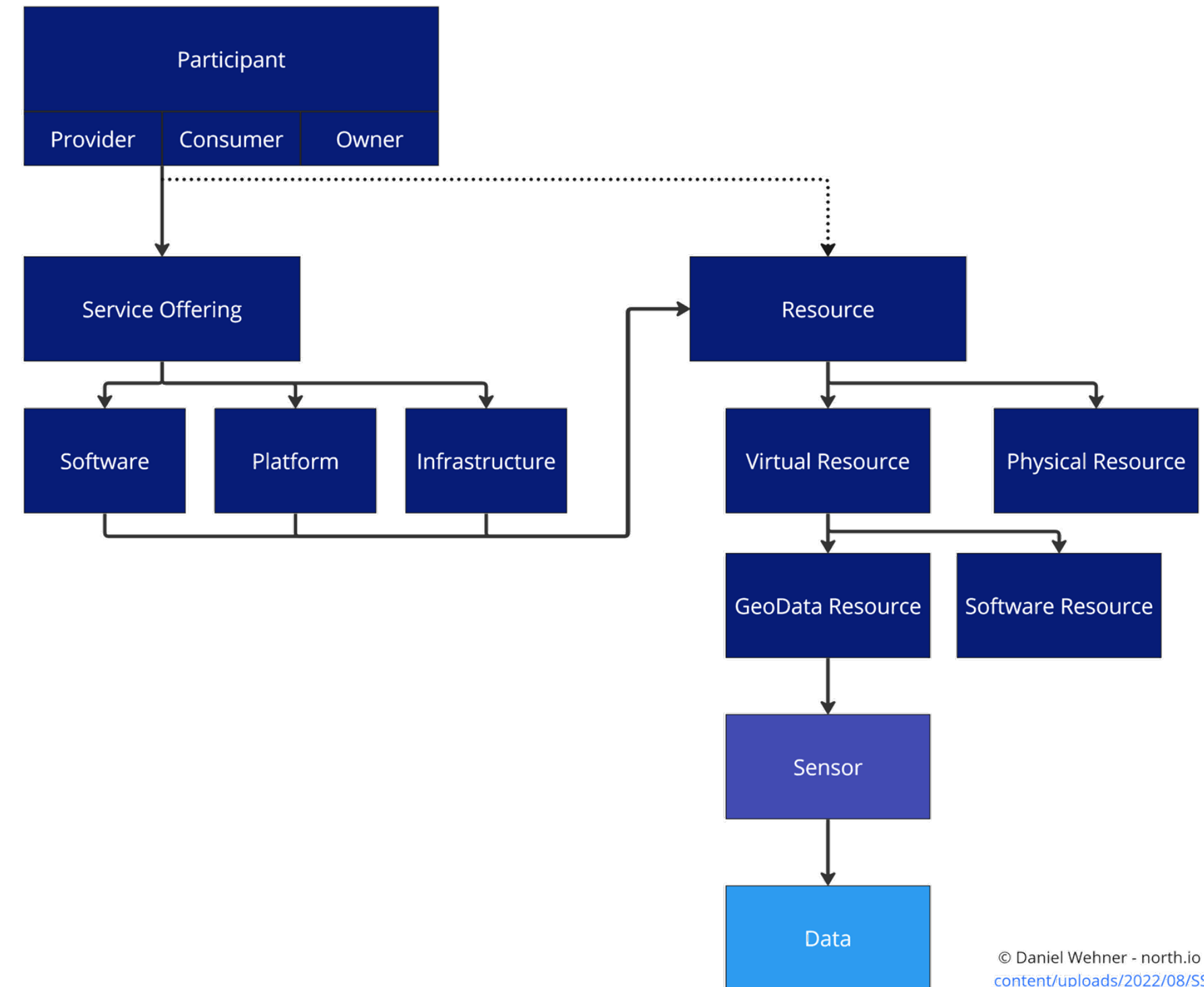
Ongoing Developments



Self-Descriptions

Participants in a Gaia-X ecosystem talk to each other in the language of Self-Descriptions. :

- Metadata records that describe providers, resources, service offerings and datasets
- Human-readable by using the JSON-LD format
- Geospatially compliant with ISO 19115, Gaia-X, DCAT and other highly specific standards (e.g. iFDO for images)
- Sensor types: Multibeam, Side Scan Sonar, Subbottom Profiler, Magnetometer, Sound Velocity Profiler, CTD, CPT, Sediment Grab Sampler, Seismic, Hydrophones, Hydrophones, ADCP, LiDAR, Images, Videos and many more
- Soon available on the Marispace-X GitHub Repository

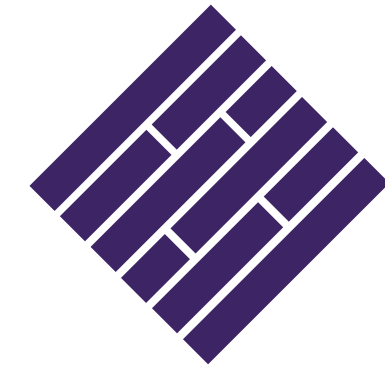


Cloud-native data format

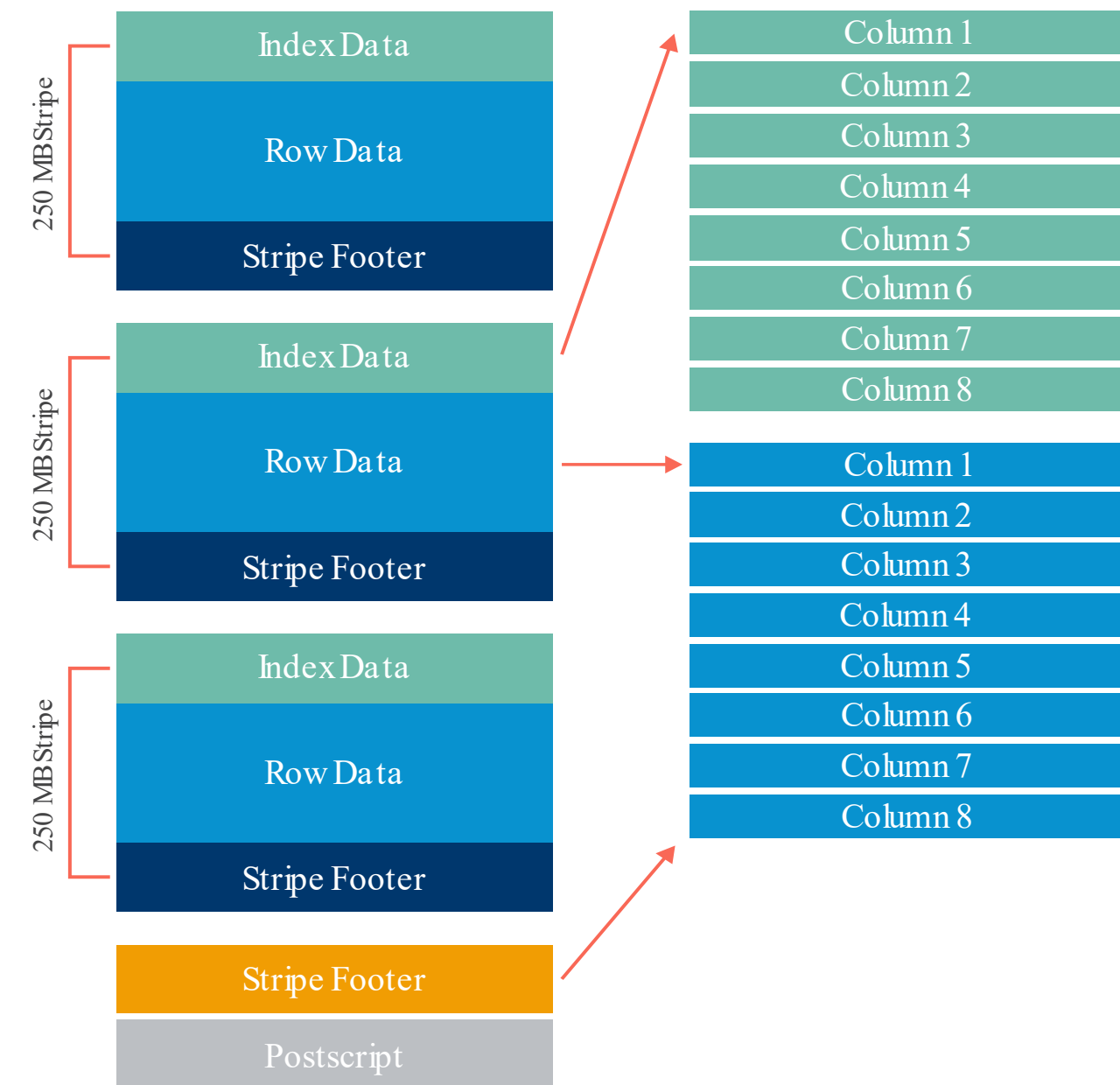
Development of a maritime cloud native data format:

- Scalable: approaches for cloud based maritime data analytics need new ways of data handling
- Industry-driven: together with specialists from our associated partners and their specific needs
- Open: the format specifications and the development process will be openly accessible
- **MariParquet** based on the Parquet/GeoParquet

Parquet



ORC file structure





Dataspaces

Artificial Intelligence

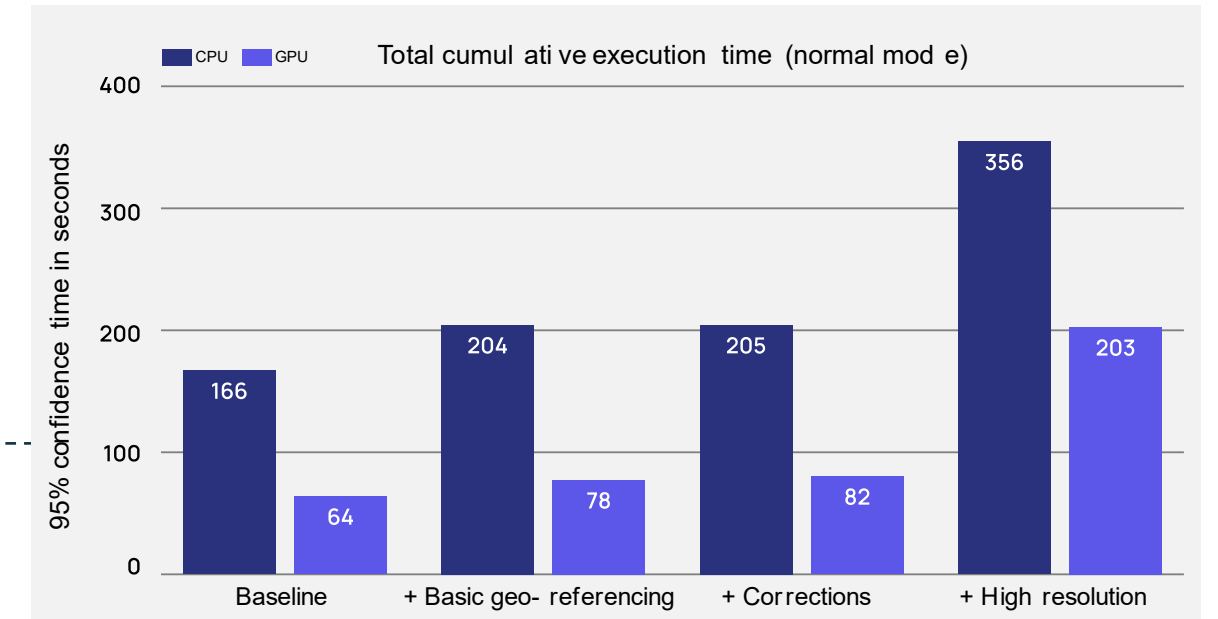
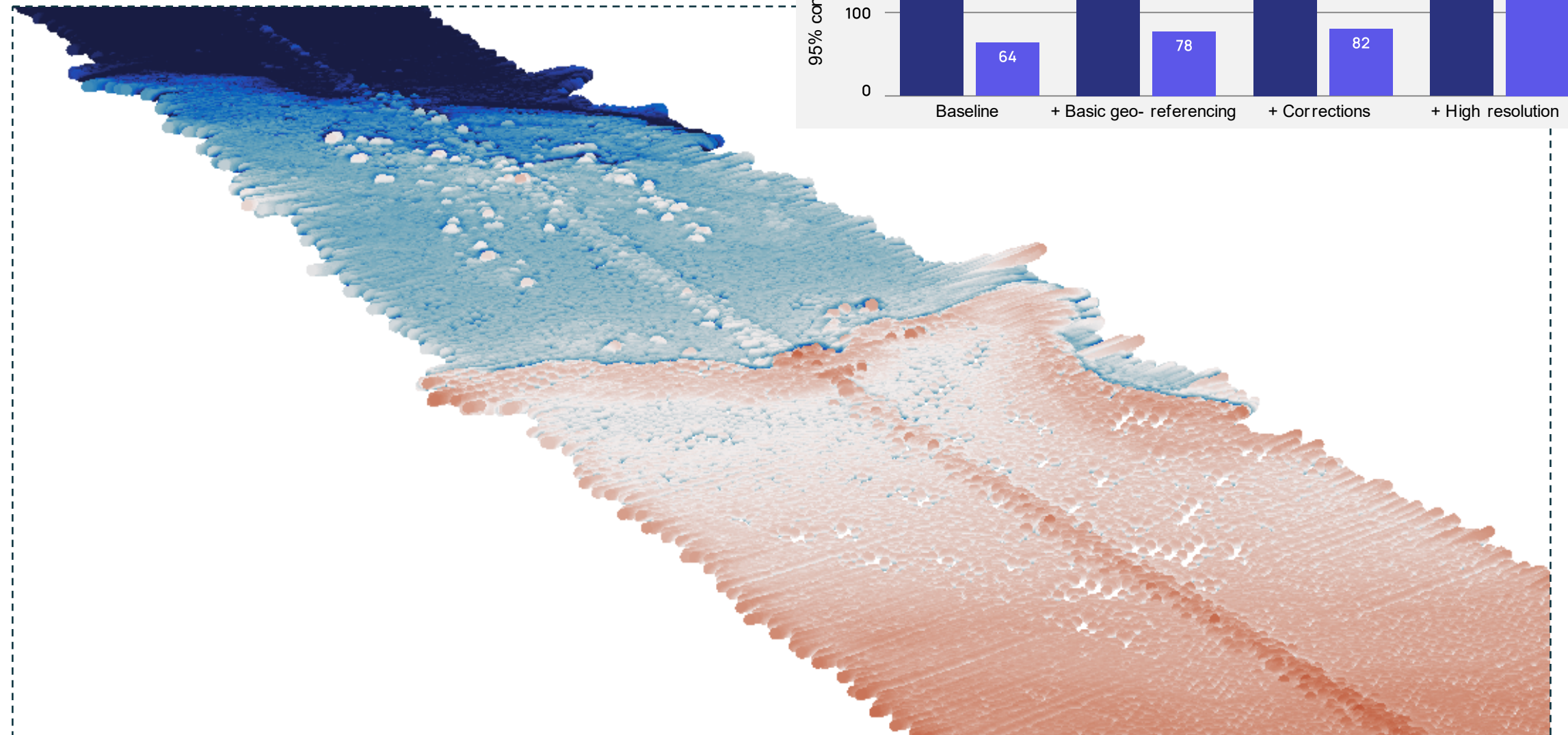
AI and GPUs

Three different projects we are right now working on in the context of AI and Accelerated Computing

Accelerated Computing

Physics-informed AI

Data Fusion



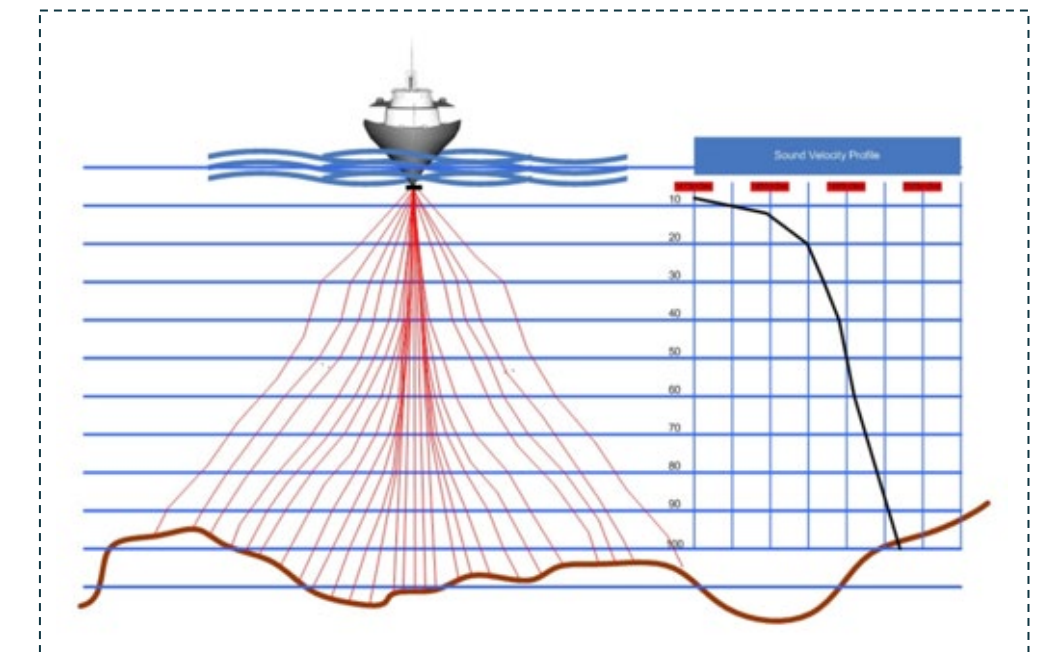
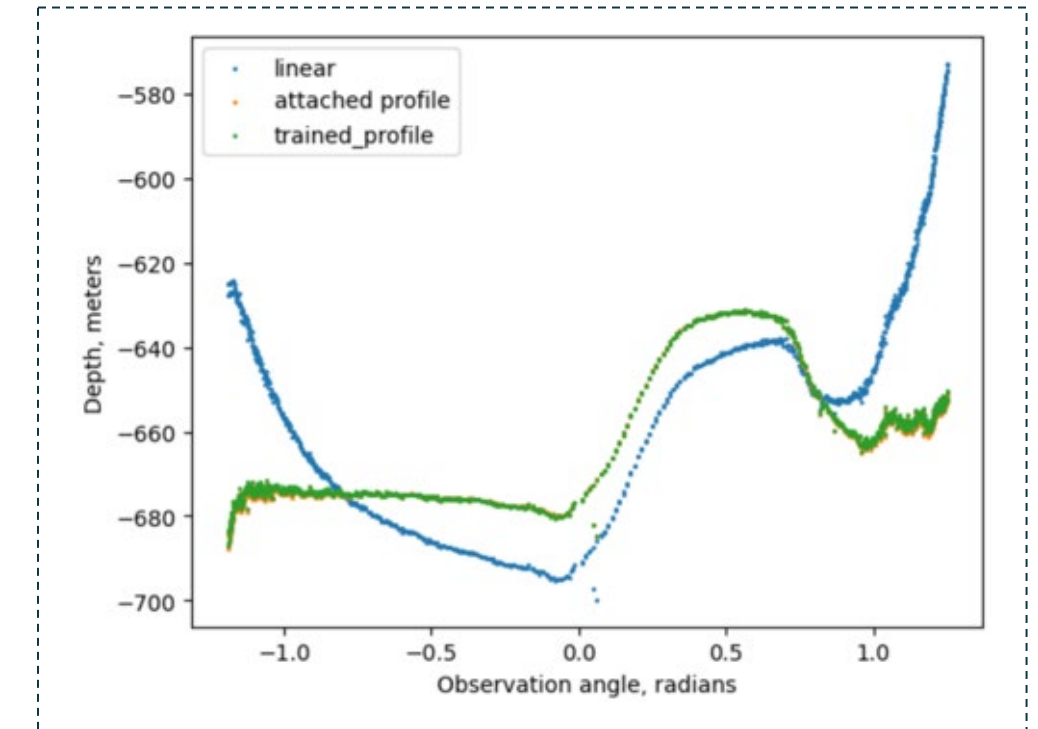
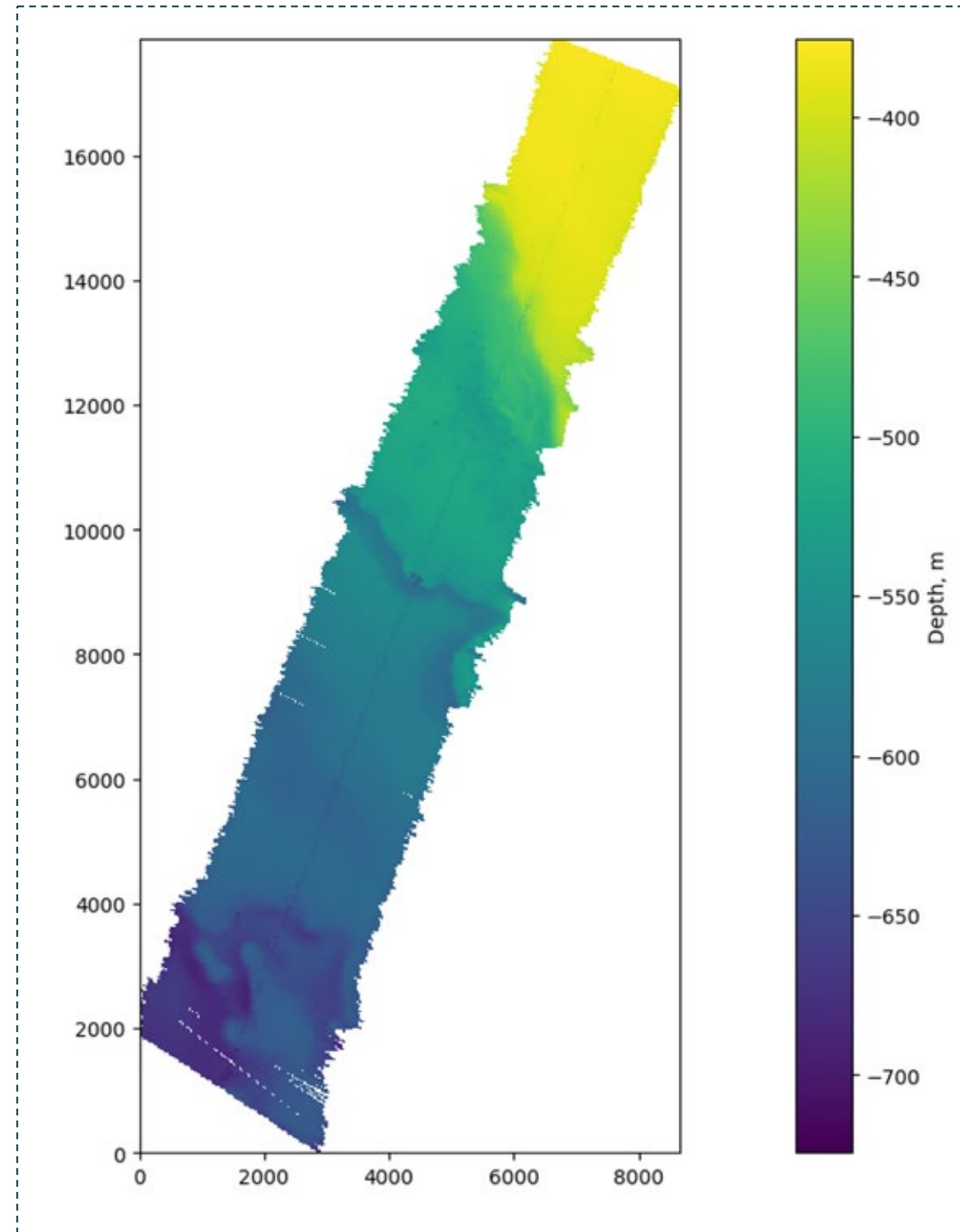
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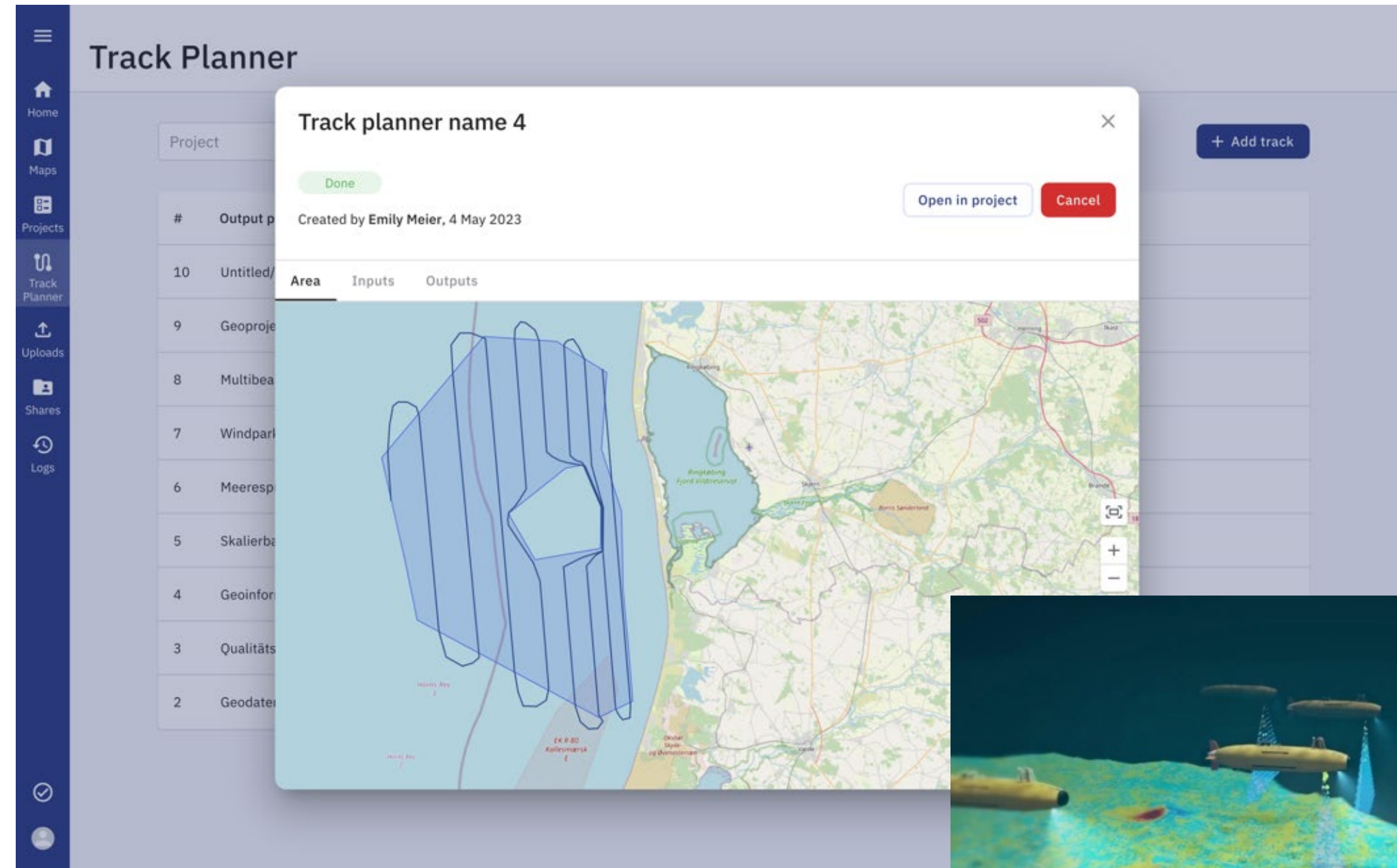
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Thanks



Jann Wendt

CEO and Founder

Degree in Geography
and Geoinformatics

Email: jwendt@north.io

