



ILIAD DIGITAL TWINS OF THE OCEAN

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3rd Destination Earth User eXchange

Darmstadt, October 16th, 2024

ILIAD numbers

Full name: Integrated Digital Framework for Comprehensive Maritime Data and Information Services

Coordinator: Netcompany

Grant Agreement No: 101037643

Project start date: 1. February 2022

Project end date: 31. July 2025

Duration of project in months: 42

Overall budget: 18 956 630 EURO

EU contribution: 17 046 230 EURO

Partners: 56 + 2 linked third parties



ocean-twin.eu



[/oceantwin](https://www.facebook.com/oceantwin)



[@ocean_twin](https://twitter.com/ocean_twin)

Digital Twins of the Ocean (and Waters)

eOSC | AqualNFRA

ILIAD is part of a vibrant ever evolving ecosystem of digital twins, including its great variety of resources ranging from data providers, cloud services, ocean modeling, biodiversity, data spaces all organized by a plethora of institutions and projects in Europe and beyond.



ILIAD DIGITAL TWINS OF THE OCEAN



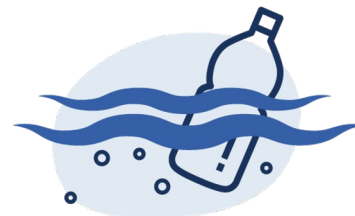
Existing Wind Farm Capacity



Ocean Energy Potential



Coastal Sediment Transport



Plastic Pollution Monitoring



Oils Spill Simulation



Insurance For Marine & Maritime Activities



Jellyfish Swarm Forecast



Harbour Safety



Met Ocean Hind, Now & Forecast



Fisheries Productivity & Sustainable Aquaculture



Ballast Water Monitoring



Aquaculture & Harmful Algae, Water Quality & Ship Traffic



Data Spaces

Socio Ecological Data/Models
Biodiversity Data/Models ... ++

Destination Earth

Reusable, Composable Digital Twins & Components

Interoperable Digital Twins

Digital Twin



Architecture

Sensors, Edge, Fog, Cloud & HPC Continuum



Quality

Best Practices, Methods & Standards

Semantic Interoperability



Workflow Engine



Visualisation & Control



Services

Iliad Services

EDITO Services

Data Lake

Iliad Data Lake

EDITO Data Lake

Engine

Iliad Engine

EDITO Engine

Models & Tools



AI / Machine Learning Services



Frontend User Interfaces & Interaction



Coastal Sediment Transport



Ocean Energy Potential



Met Ocean Hind, Now & Forecast



Ballast Water Monitoring



Harbour Safety



Existing Wind Farm Capacity



Jellyfish Swarm



Oil Spill



Plastic Pollution



Fisheries & Sustainable



Marine & Maritime Insurance



Aquaculture, Water Quality &

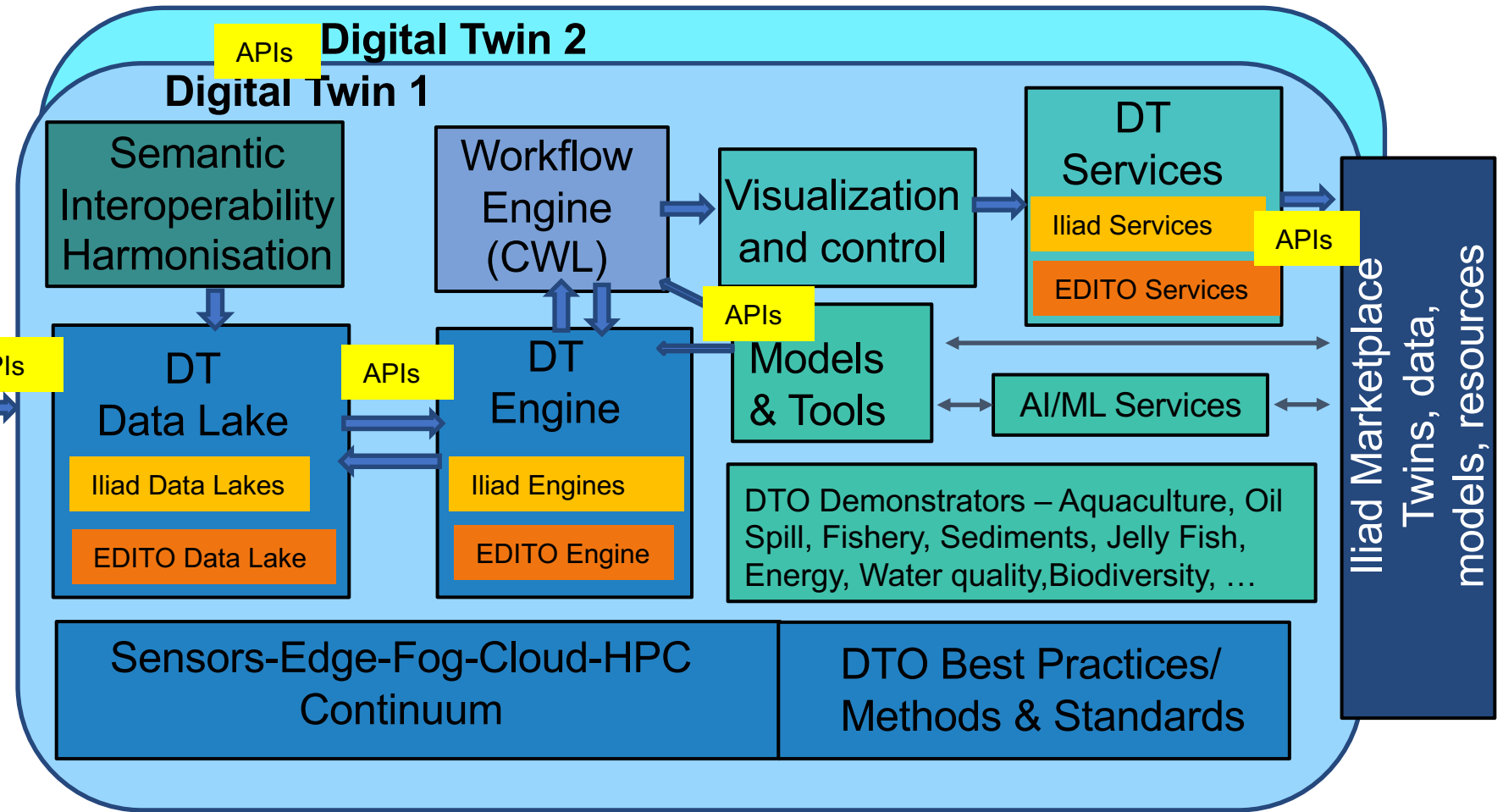
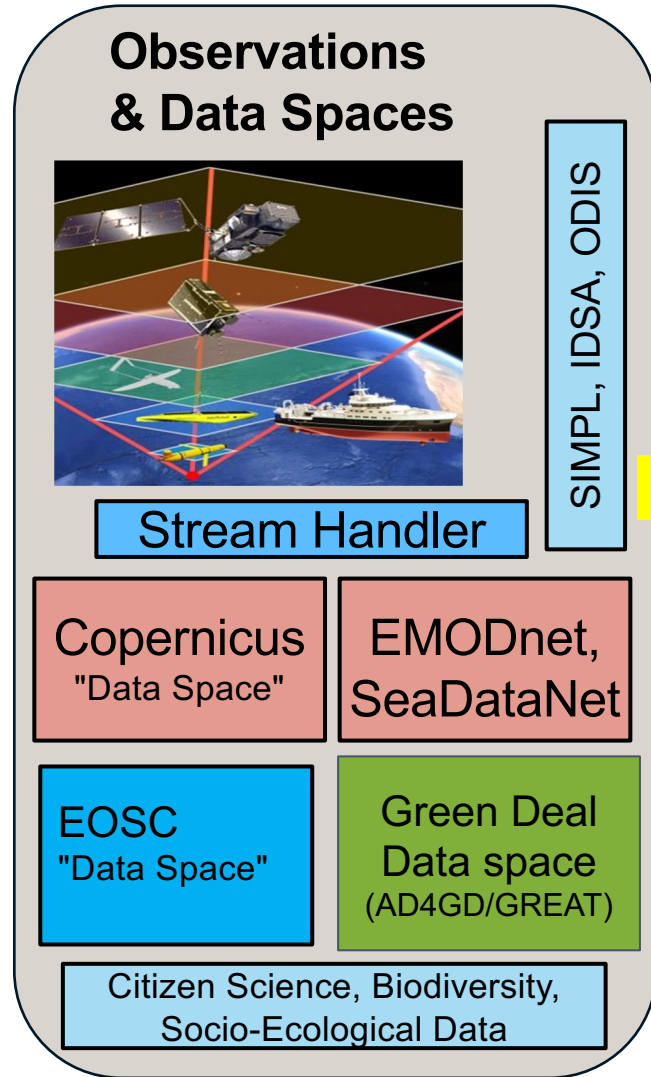
Pilot group	Pilot lead	Pilot name	Iliad DTO Results - Sensors, Data, Services, Components																				
			WP2-1: Ex. data sources/data bases, ODIS, SeaDataNet, ...	WP2-2: Sensor data capabilities	WP2-3: Providing Operational pilot data/base	WP2-4: Using EMODNet, CMEMS, EDITO ...	WP3-1/2: Citizen Science services	WP3-3/4/5: Citizen Science Apps	WP4.1: Federated Catalogue and Identity	WP4.2: Ocean Information Model- OIM	WP4.3: Semantic discovery	WP4.4: Ocean DS - DTO Data Lake - OGC APIs, STAC, EDITO, ODP	WP4.5: Semantic APIs (OGC), EDR, ...	WP4.6: StreamHandler	WP5-1: AI and Analytics services- including CWL	WP5-2: Model Integration services	WP5-3: Data Assimilation and Data-driven surrogate models	WP5-4: Thematic modelling services	WP5-5: ML Services for pattern discovery and event detection	WP5-6: User-defined analytics and event subscription service	WP6-3: Performance and Dashboards	WP6-4: Geo-Data Visualization	WP6-5: Immersive, Interactive Visualization (V/AR)



A-Reference (8)	Responsible	Pilot name																					
A	NTNU/SOCEAN	03 Water quality - Environmental pollution monitoring	X	X	X	X	(x)		X	X		X	(x)	X	X		X	(x)	X	X	X	X	(x)
A	FORTH	04.01 Oil Spill Coastal Cretan Sea	X	X	X	X			(x)		(x)	(x)		X	X	X	X	X	X			X	X
A	DUTH	04.02 Oil Spill Thracian Sea	X	X	X	X	X	X	(x)	X		(x)		X	(x)	(x)	X	X	X		(x)	(x)	
A	SOCEAN	07.01 Aquaculture - Norway	X		(x)	(x)			(x)	(x)	(x)			(x)	X		X	(x)	(x)	X	X	(x)	
A	ILVO	08.01 Fisheries NS	X	(x)		X			(x)	(x)	(x)				X		X	X	(x)	X	X		
A	UoH	10.01 Jellyfish (Swarm Forecast)					X	X	(x)	X	X		X			(x)		X					
A	FORTH	11.02 Harbour safety - ship routing, Heraklion	X	X	X	X			(x)		(x)	(x)		X	X	X	X	X	X			X	X
A	WAVEC	12.01 Wind Farm/Energy maintenance & operations	X			X			(x)		(x)	(X)			(x)		X	X	(x)	(x)	(x)	X	X
B-Inspireplication (14)																							
B	Genillard	02 Aquaculture Risk Metrics Norway (AqRM)	X		(x)	(x)			(x)	X		(x)			(x)			X			X	X	
B	UoH	04.03 Oil Spill - Israel/Mediterranean - Haifa	X			(x)				(x)												X	
B	TalTech	06.01 Coastal Sediment Transport, Estonia		X	X					(x)								X					
B	UoH	06.02 Coastal Sediments and Harbor safety, Haifa port		X	X					(x)									X				
B	AMA	07.03 Aquaculture - Italy (Mussels)		X	(x)	X								X									
B	AGIR	07.04 Aquaculture - Morocco								X	X									X			
B	TerraSigna	08.02 Fisheries - Black Sea	X		X	X				(x)	X	(x)						X	X			X	
A	UoH	10.02 Seascape ecology and biodiversity	X	(x)	(x)					X					X				X				
B	RAMANI	10.03 HAOPs (Next Port of Call Risk Assessment)							(x)	(x)	X		(x)					X	X	X			
A	TUV	11.01 Harbour safety Varna port		(x)				X						X				X	X				
B	CEA	12.02 Wind Energy - Project Review Tool									X								X	X			X
A	UEDIN	13.01 Tidal Energy	X	(x)	(x)	X			(x)	(x)				X				X		(x)			
B	EWP	13.02 Wave Energy		X	X				(x)	(x)				X				X			(x)		
B	UoH	21 Cultural Heritage - Israel	X						(x)									X			(x)		



Interoperable digital twins



European Digital Twin of the Ocean

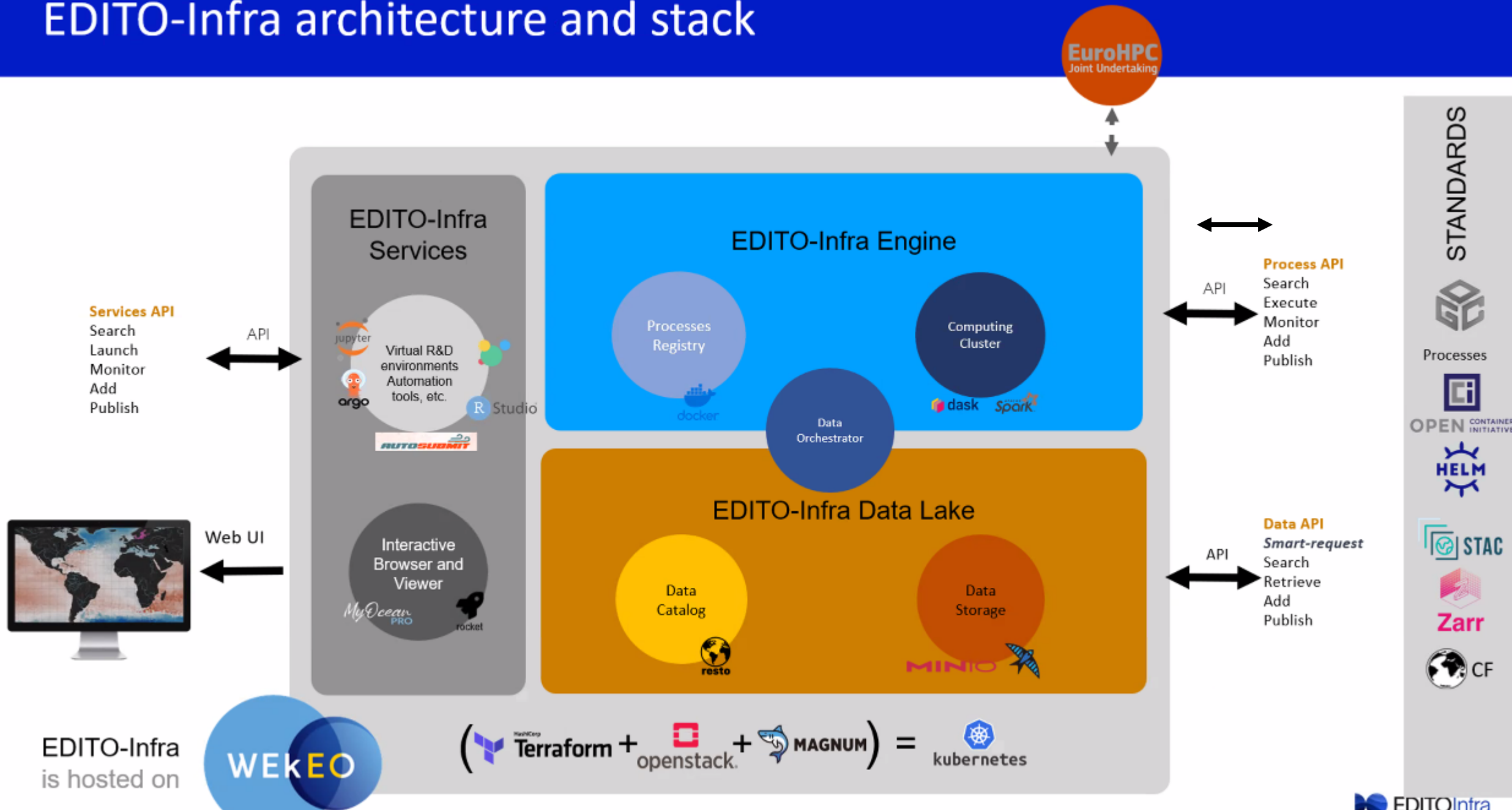
A leap in ocean knowledge and sustainable action

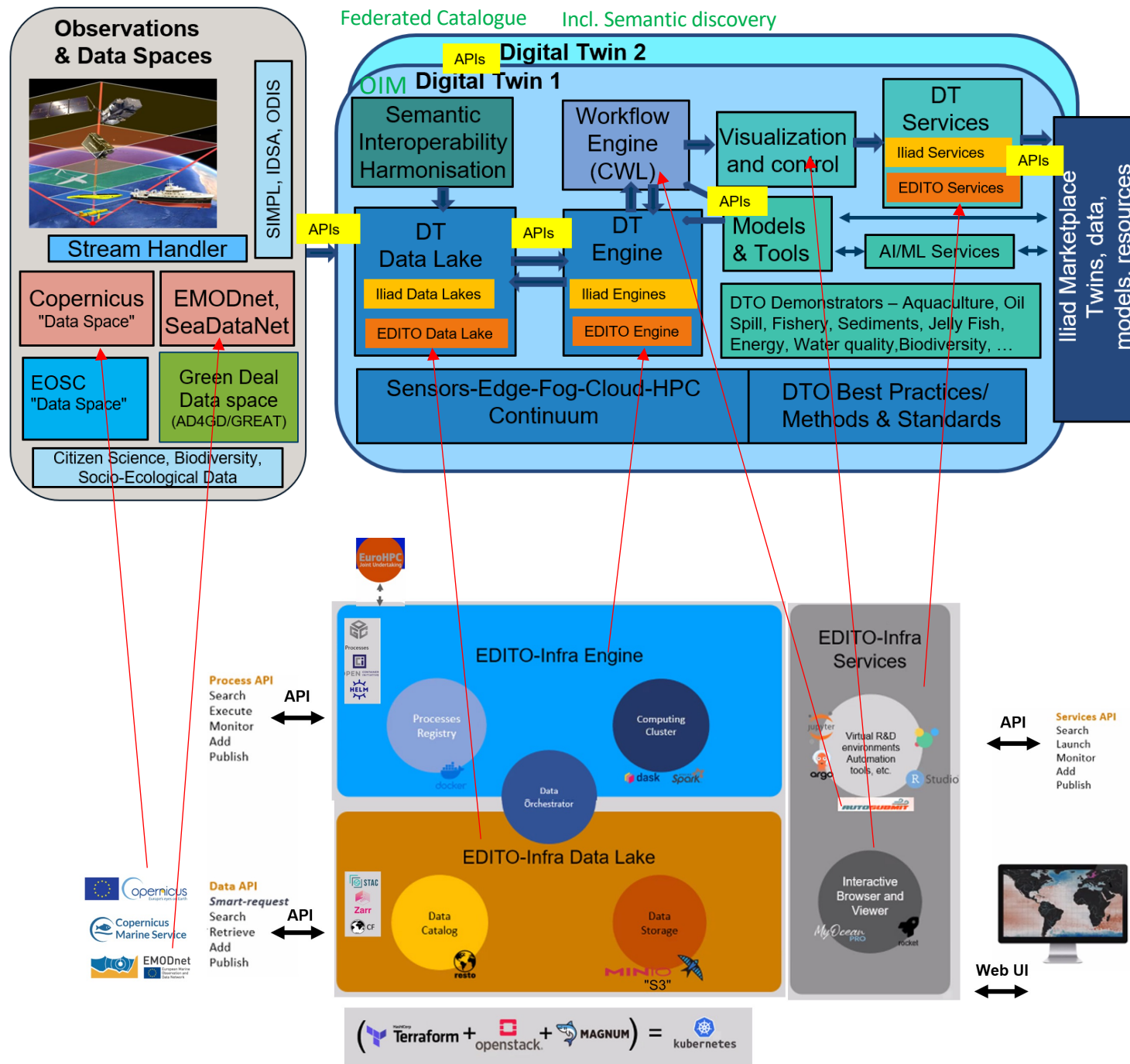
 **EDITO**Infra
European Digital Twin Ocean

 **EDITO**Modellab



EDITO-Infra architecture and stack







DTO-BioFlow

Integration of biodiversity monitoring data into the Digital Twin Ocean

DTO-BioFlow Demonstrator Use Cases
Invasive species, Pelagic biodiversity, Sustainable mariculture, Low impact fishery, Marine Protected Areas management ...

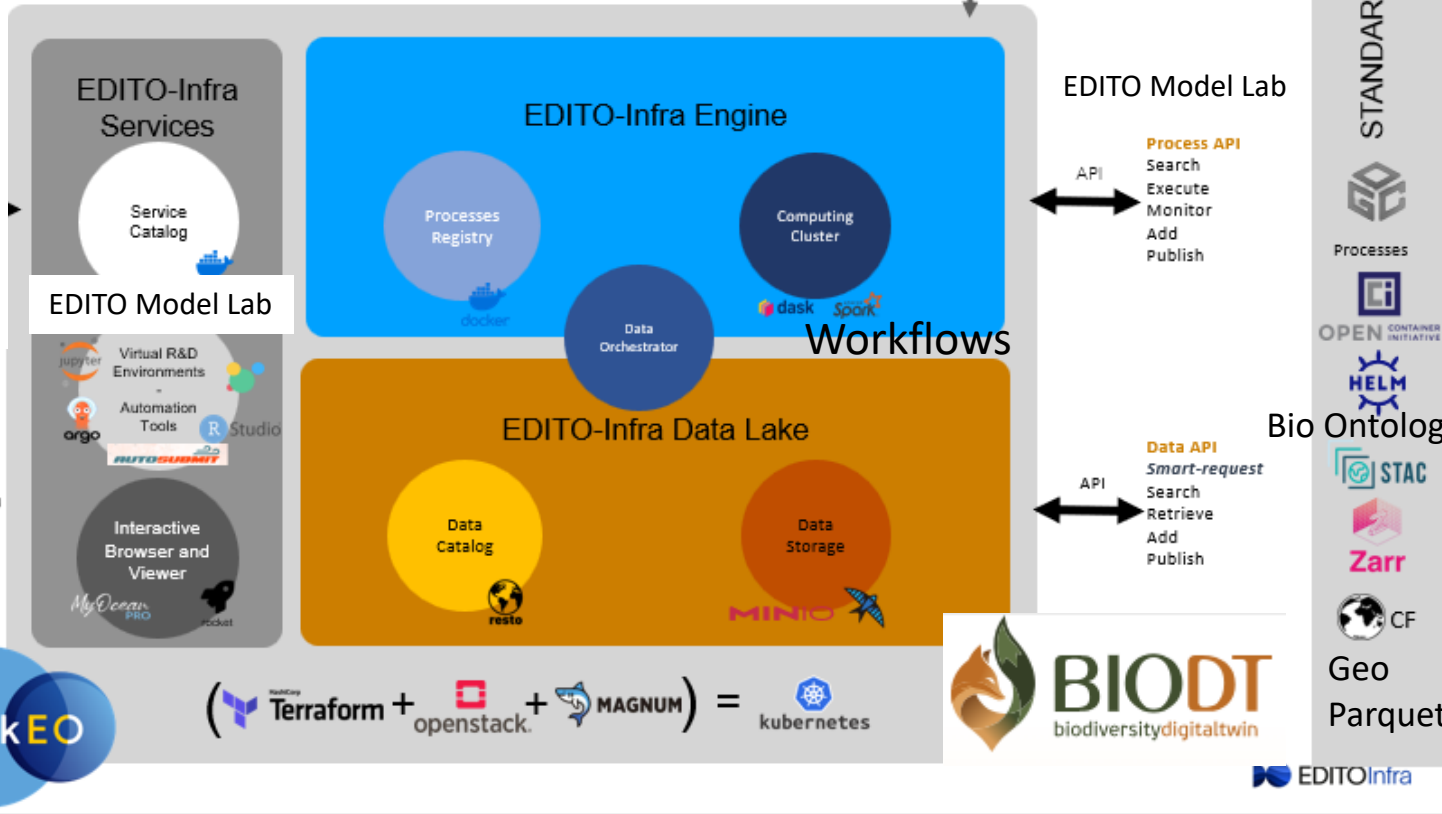


Web UI

EDITO-Infra is hosted on



(Terraform + openstack + MAGNUM) = kubernetes



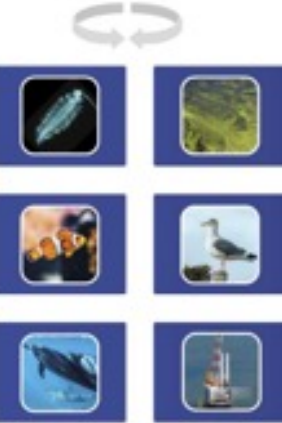
DTO-BioFlow



Unlock sleeping Biodiversity data
image, video, acoustics, eDNA, satellite, ...

Data sources

Test casing cost-effective bio-monitoring



Set up agreements with existing data holders



EMODnet
European Marine Observation and Data Network

Biology

EMO BON

eosc

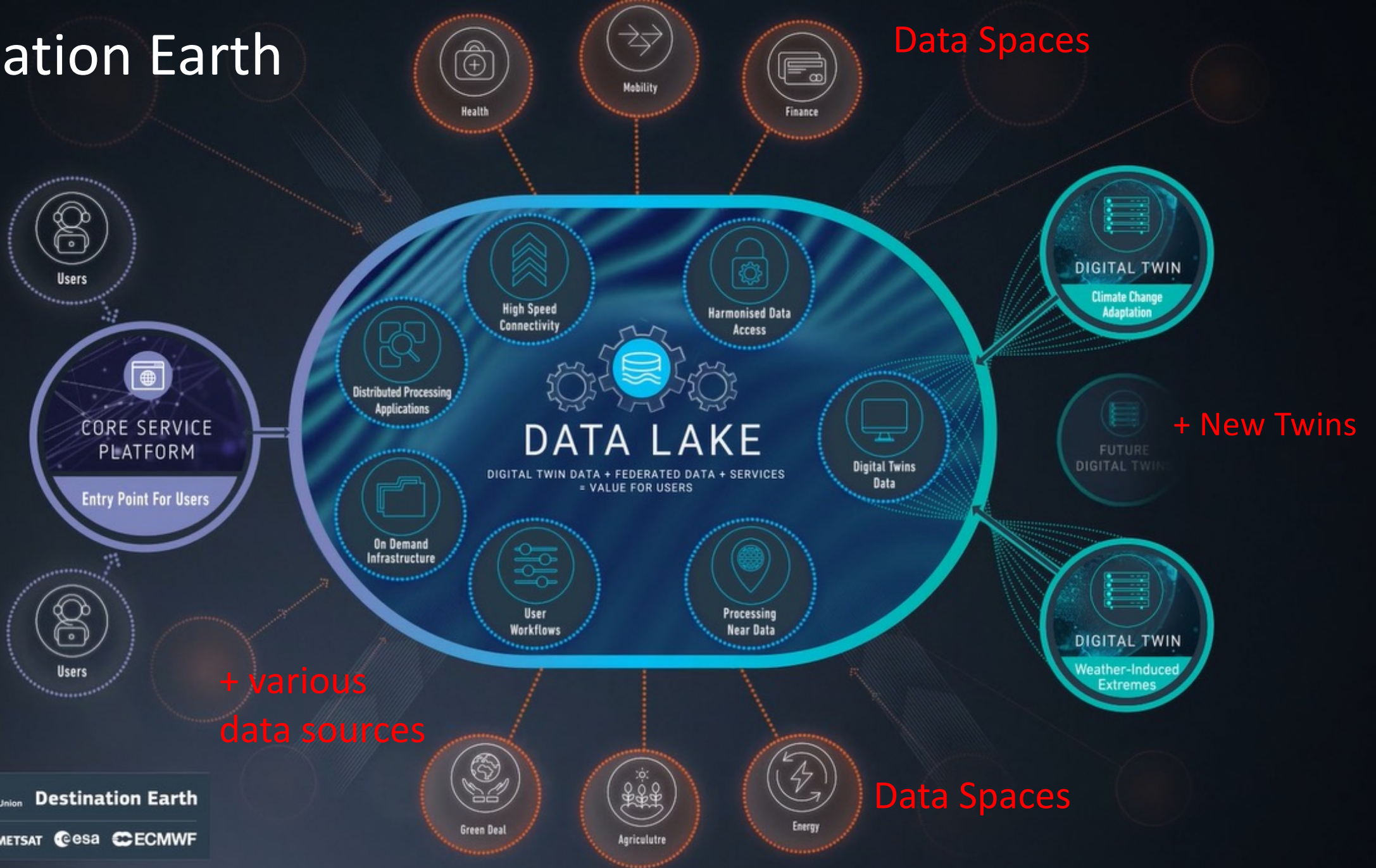
Iliad

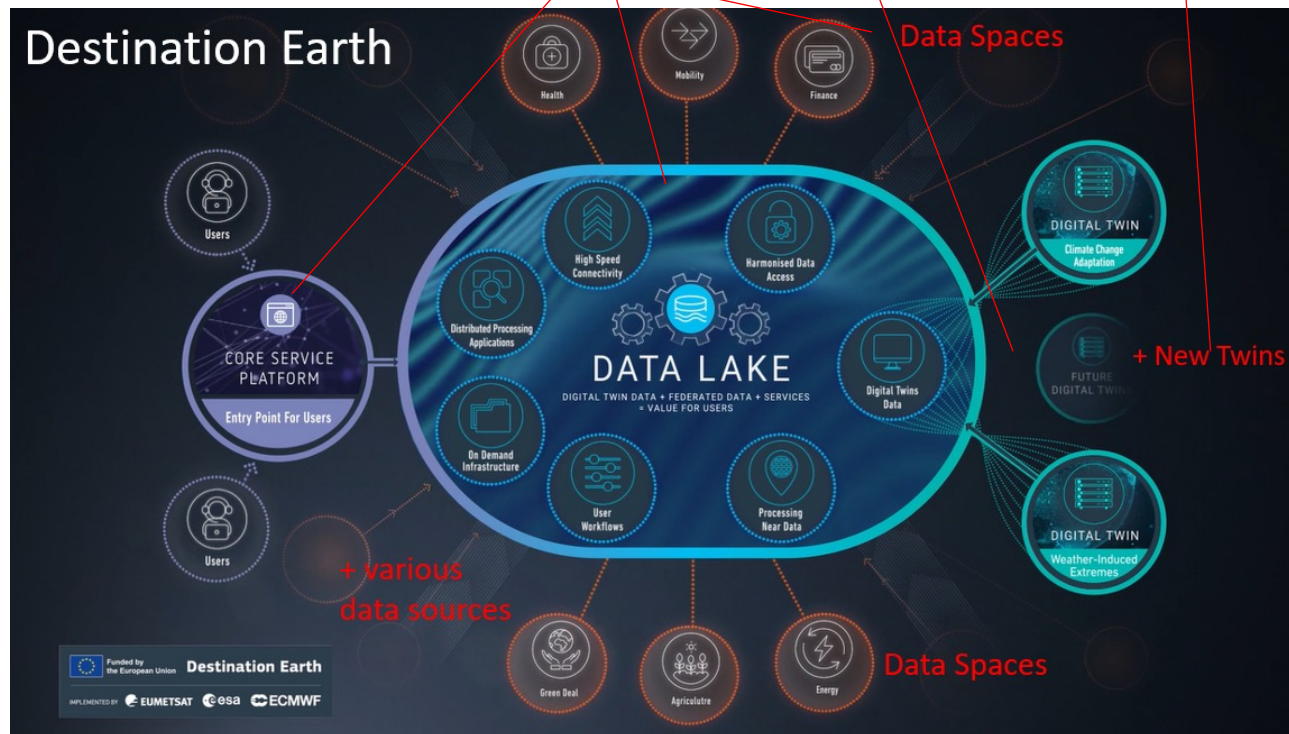
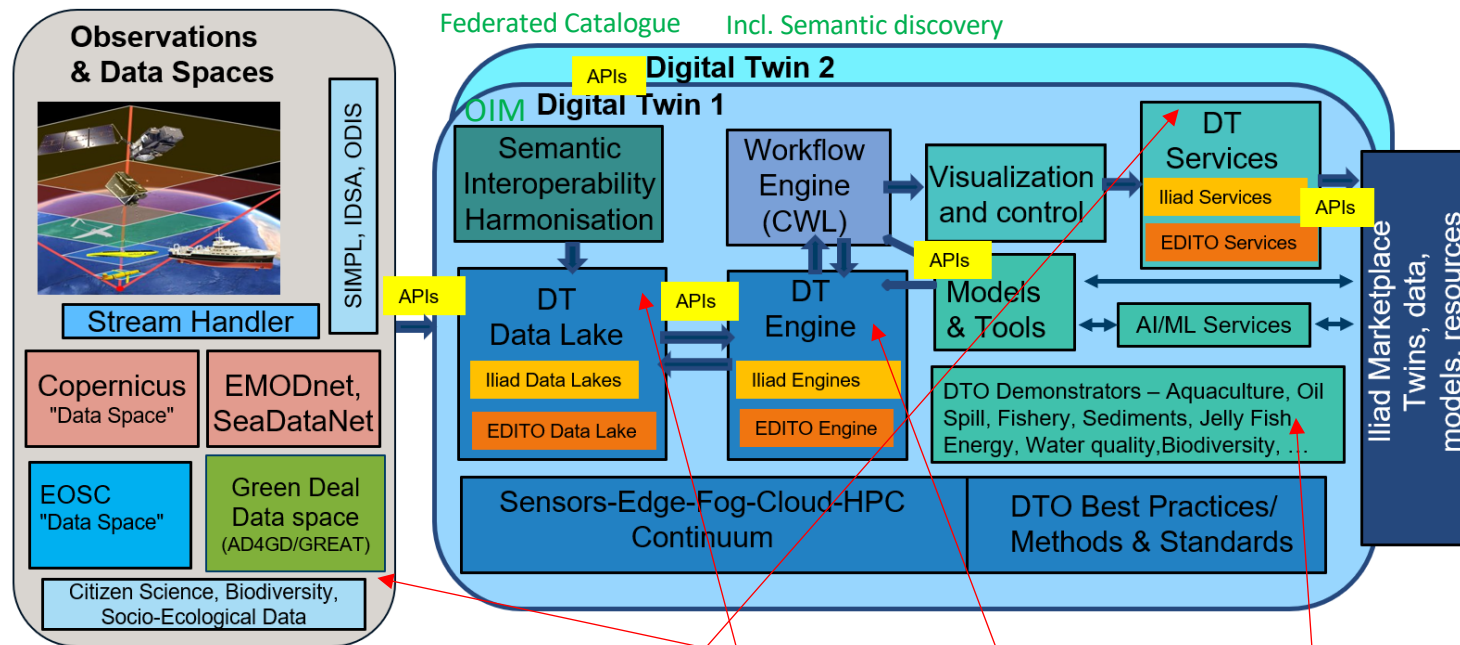
European Data Spaces

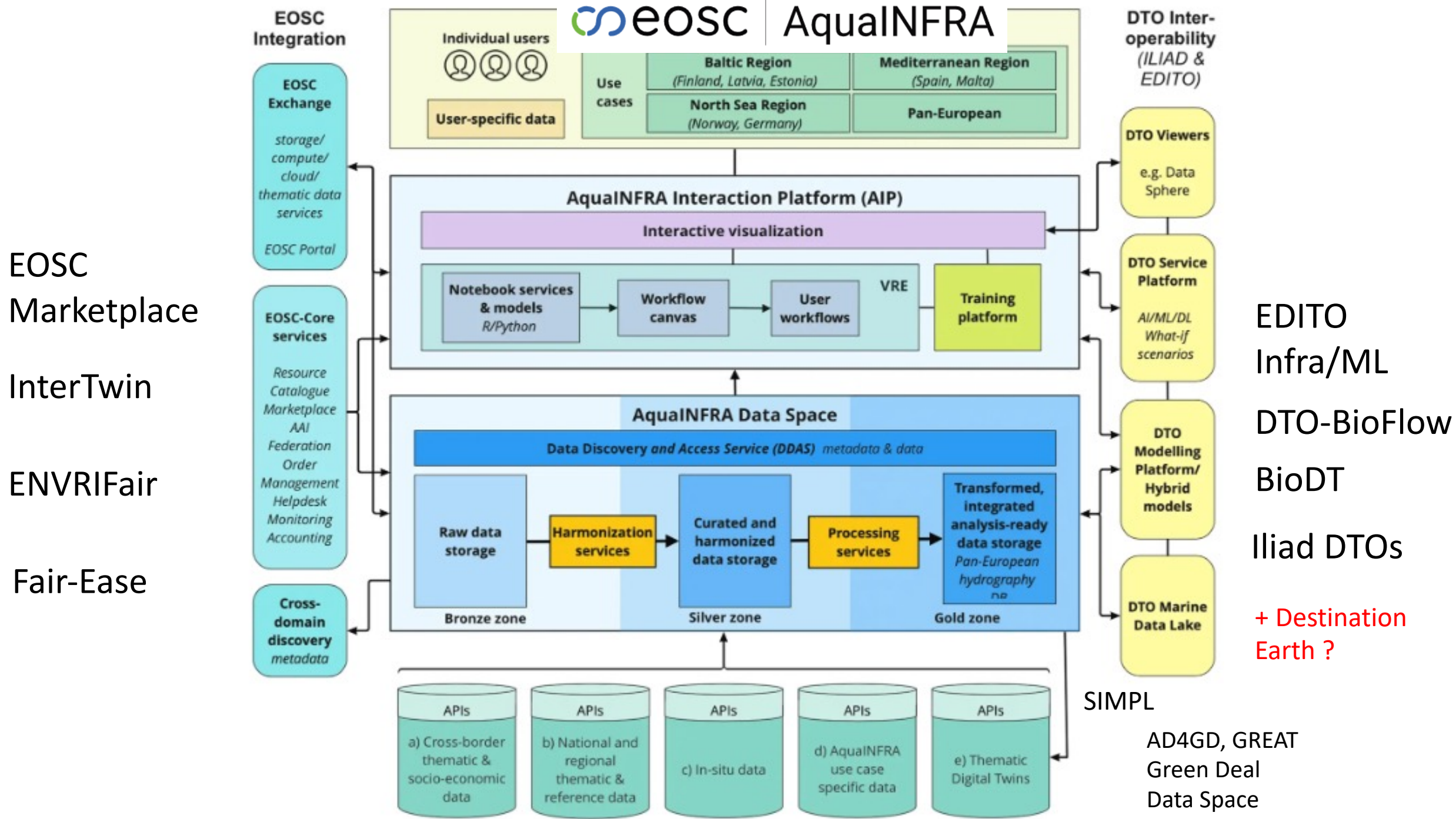
GBIF Global Biodiversity Information Facility

- STANDARDS
- Processes
- OPEN CONTAINER INITIATIVE
- HELM
- Bio Ontologies
- STAC
- Zarr
- CF
- Geo
- Parquet

Destination Earth







EOSC Marketplace
InterTwin
ENVRIFair
Fair-Ease

EDITO Infra/ML
DTO-BioFlow
BioDT
Iliad DTOs
+ Destination Earth?

SIMPL
AD4GD, GREAT
Green Deal
Data Space


EOSC - Berlin and online, Tuesday October 22nd, 2024

17:00 → 18:00 **EOSC and the Digital Twins**

 Grenander I

Digital Twins have proven their potential in revolutionising approaches to challenging tasks in the industrial sector, and are increasingly being leveraged as a research method bringing similar innovative approaches to the way science is performed.

This session aims to bring relevant Digital Twins initiatives in Europe (DestinE, BioDT, DT-GEO, interTwin and ILIAD/aqualnfra) highlighting new dimensions of interoperability at data and service levels. Thanks to the focus on interoperability, as well as on challenges and transferrable approaches and tools, the session will be a unique opportunity for the EOSC Community to discover the wide range of possibilities that Digital Twins can offer, in all research domains, and the role Digital Twin Platforms can play in future EOSC Nodes.

 Watch promo video

Get to know the speakers

17:00

Opening of the session

Speaker: Xavier Salazar (EGI Foundation, InterTwin)

 5m

17:05

Short presentations from the projects

- interTwin, Xavier Salazar, EGI Foundation
- BioDT, Gabriela Zuquim, CSC - IT Center for Science
- DT-GEO, Ignacio Blanquer, Universitat Politècnica de València
- ILIAD / Aqualnfra, Arne Berre, SINTEF Digital
- Destination Earth, video message by Thomas Geenen, European Centre for Medium-Range Weather Forecasts

17:30

Panel discussion - Digital Twins and EOSC Nodes: Opportunities and Challenges

- Xavier Salazar, EGI Foundation (chair)
- Arne Berre, SINTEF Digital
- Ignacio Blanquer, Universitat Politècnica de València
- Gabriela Zuquim, CSC - IT Center for Science

17:55

Wrap-up

 5m

 eosoc

**EOSC
Symposium
2024**

21 - 23 October / Berlin, Germany