GIS, a Foundational Building Block of a Digital Twin of the Ocean

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Esri

esri | THE SCIENCE OF WHERE

Megatrends Shaping The Future

Leaner, cleaner and greener

Natural Resources

Underwater waste management

Technology Innovation

Seawilding

Changing Weather

Autonomous Everything

Changing Climate

Conservation

Business Processes

Decision Making

Communication

Efficiency

Lower Risk

Collaboration

. . . Needing Holistic & Collaborative Approaches

Digital Twins *are virtual representations of the real world . . .*

. . . including physical objects, processes, relationships and behaviors.

GIS creates digital twins of the natural and built environment . . .

. . . and uniquely integrates many types of digital models.

Digital Twins Abstract and Model the Physical World

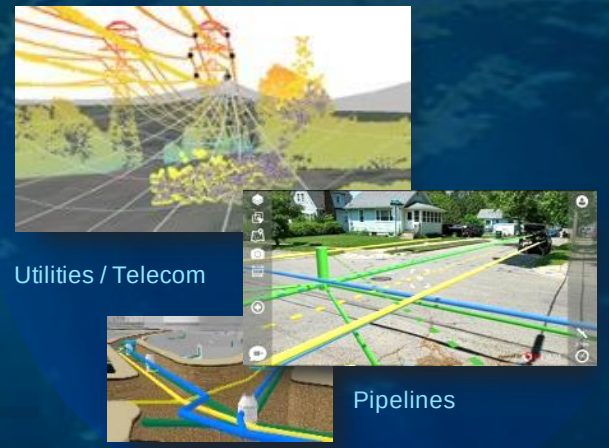
GIS is the framework for Creating & Integrating Digital Twins

Buildings

Facilities / Indoors

Plants / Structures

Networks

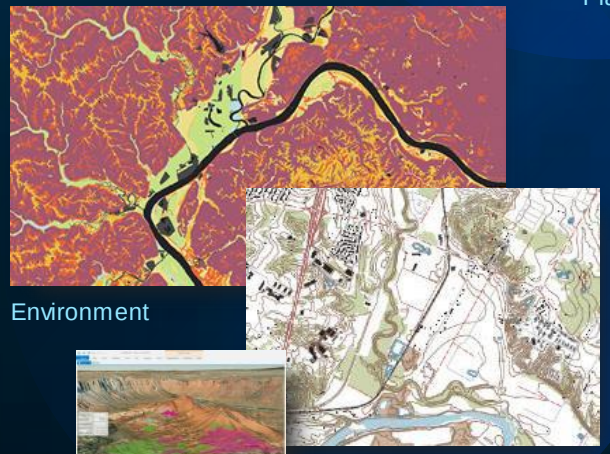


Utilities / Telecom

Pipelines

Roads and Highways

Landscapes



Environment

Topographic

Cities

Smart City

Planning

Digital Twins Abstract and Model the Physical World

GIS is the framework for Creating & Integrating Digital Twins

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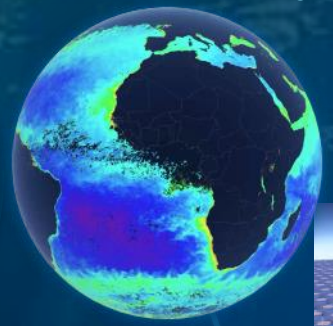
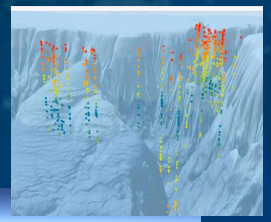
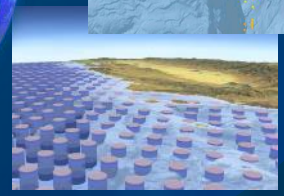
Oceans

Ocean Health



3D Interpolation (EBK)



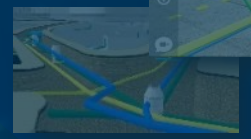


Ecological Marine Units

Networks

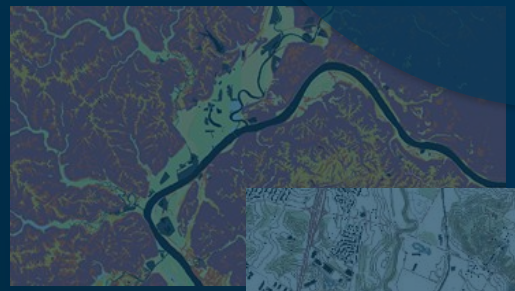
Utilities / Telecom

Pipelines



Roads and Highways

Landscapes



Environment

Topographic

Cities

Smart City

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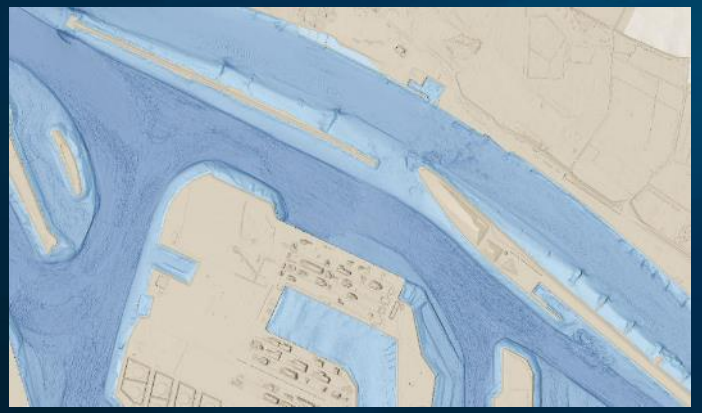
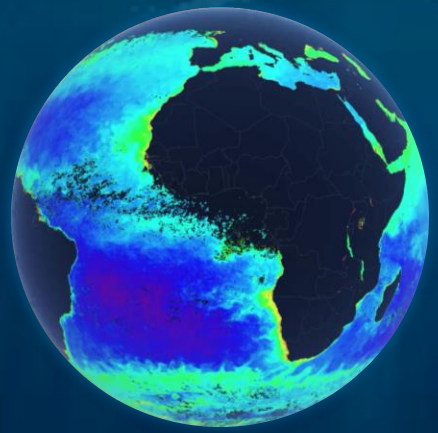
The Digital Twin of the Ocean

Will be 1D, 2D, 3D, 4D, …

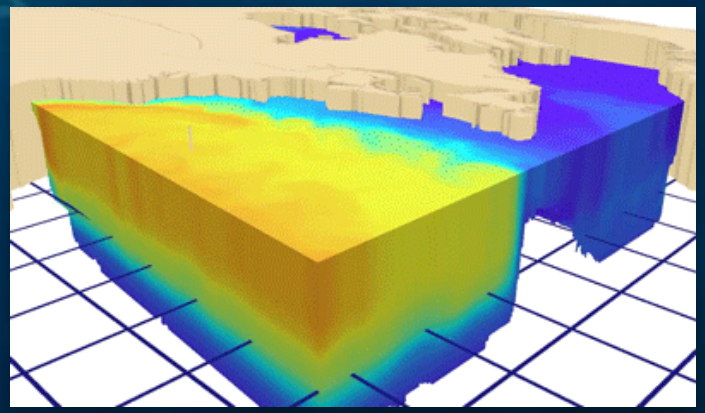
Integrated Topo-Bathy



Computational Fluid Dynamics



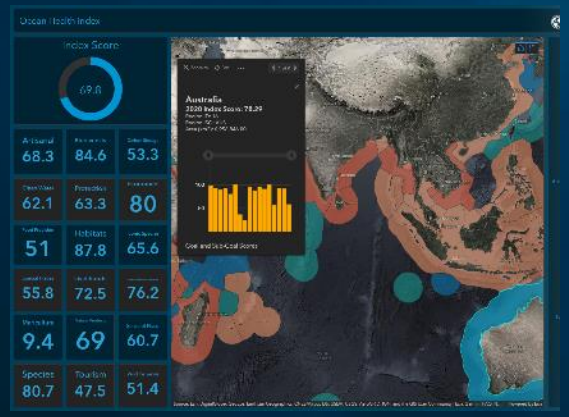
Multidimensional Data



The Digital Twin of the Ocean

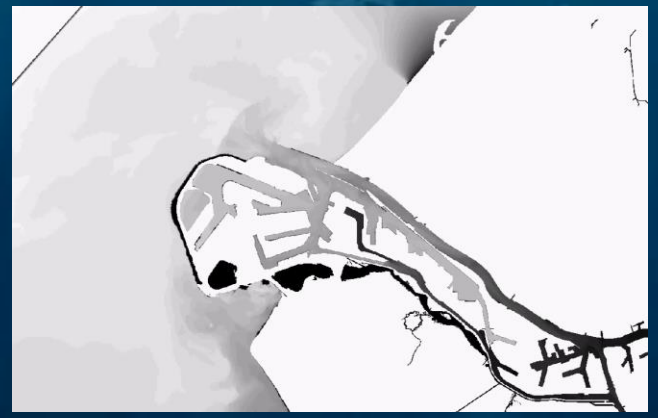
Will be Time-Dependent

Current Conditions



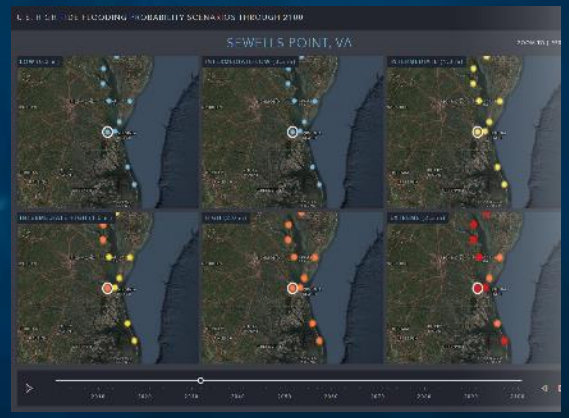
Dashboards, GeoEvents

Short-term Simulation



Computational Fluid Dynamics, Agent-based Models

Long-term Models



Models & Scenarios

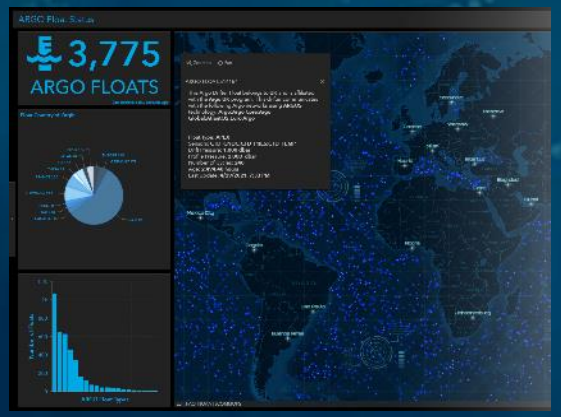
The Digital Twin of the Ocean

Will Produce Big Data

Deep Learning

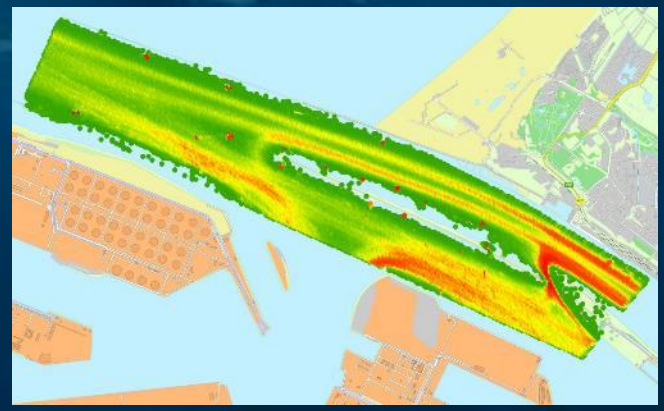
Catfish Detection, GeoAI

Sensor Data



Time Series

Trend Analysis



Ship Locations, Tracks, Density, Count Movements

Maturity Levels of Digital Twins

buildingSMART	IEEE	esri
Transformative	Human Machine Interaction	Autonomous
Prescriptive	Control	Semi-Autonomous
Predictive	Integration	Real-time (Dynamic)
Informative	Model	Analytical (Static)
Descriptive	Computing Capabilities	Visual (Model)
	Data	Capture

Scales of Digital Twins

Built on an Integrated Geospatial Infrastructure

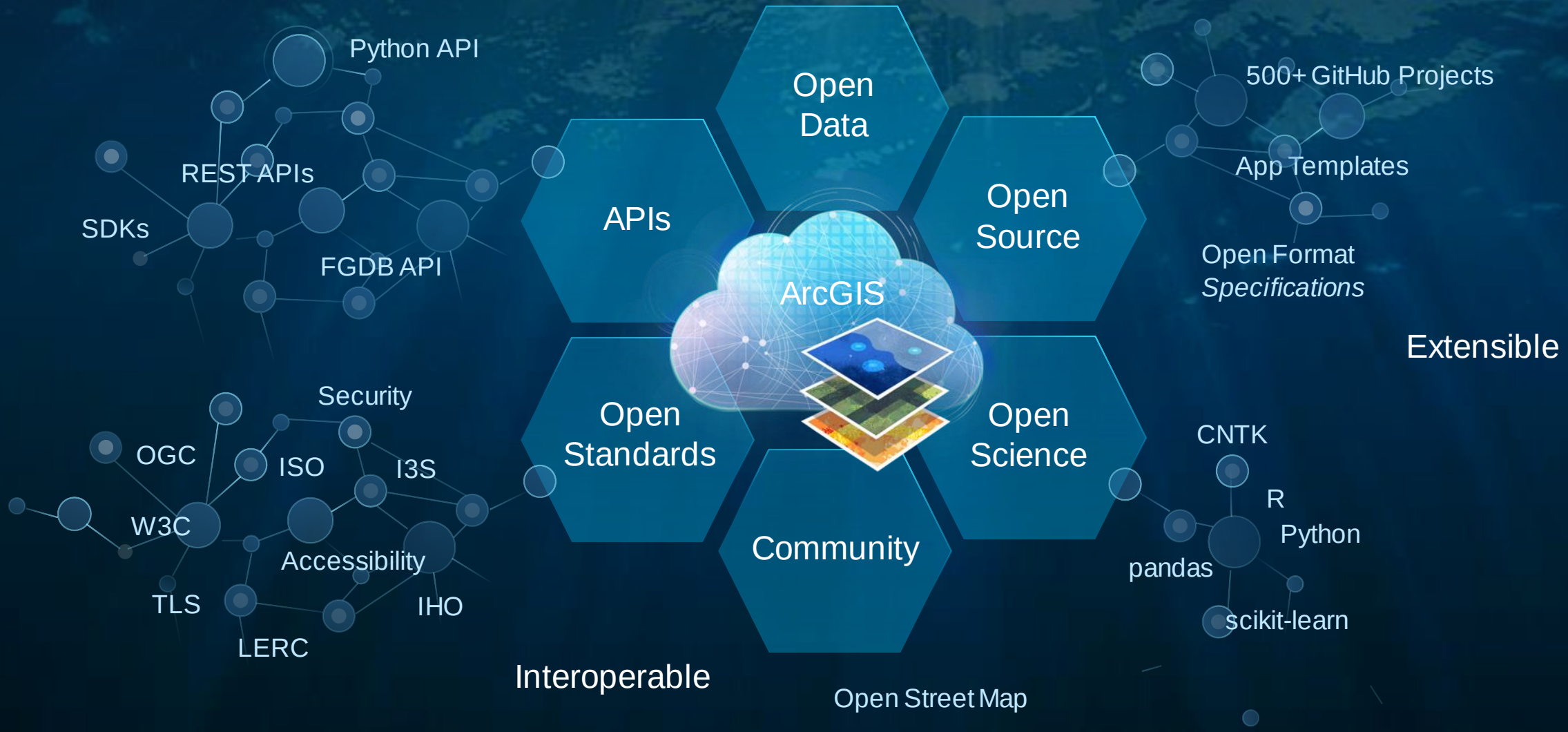
Our Own Content

Including Content from Others

Integrated Geospatial Infrastructure (Data Spaces, Data Mesh, Data Fabric, …)

The Digital Twin of the Ocean

Built on Interoperable Technologies



ArcGIS Supports a Digital Twin of the Ocean

. . . Modeling the complete Lifecycle

https://oceans-esrioceans.hub.arcgis.com/

GIS for Ocean

Ready to use maps, layers, and applications to better understand our oceans

Welcome to the GIS for Ocean webpage. This hub serves as a resource to help collate the wealth of ready to use ocean related GIS resources available to the community. Whether you are in search of content to add to your maps, blogs from the community about practical uses of ocean data, or applications that provide data-driven answers, you are in the right place!

Argo Floats

3,826

Actively collecting

Source: ARGO Locations (Latest Locations)

Coral Bleaching

52

Locations at risk

Source: NOAA Coral Reef Watch (CRW) Virtual Stations

U.S. Marine Protected Area

4,074,796.75

sq km of protected area

Source: NOAA's Marine Protected Area Inventory


Join us for VIRTUALLY at the
"Deep Ocean Collective Solution Accelerator"
9:00AM-12:00PM (PT)
October 2 & 5, 2023
Register to virtually take part in the...
Opening Plenary (2 Oct)
https://tinyurl.com/5bhhapc3
Closing Report Out (5 Oct)
https://tinyurl.com/yfdj9kyj
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