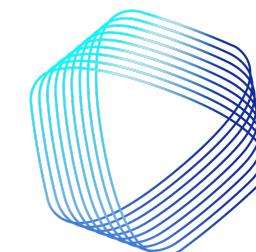
A large, abstract network graph composed of blue dots (nodes) connected by blue lines (edges). It forms a complex, organic shape that tapers towards the top left. In the bottom right corner, there is a faint, semi-transparent watermark of the word "ocean" next to another network graph.

presentation

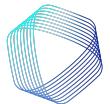
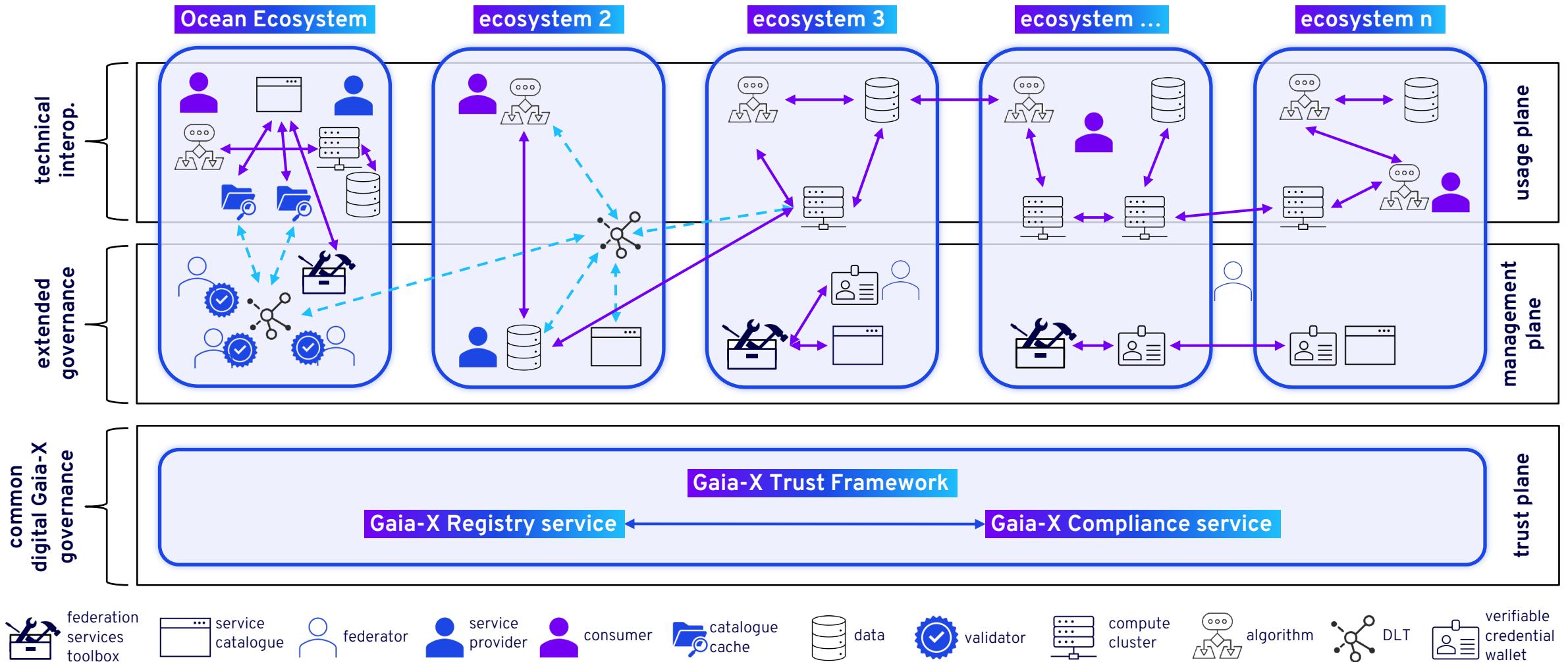
Bootstrapping Gaia-X Ecosystems



deltaDAO

bootstrapping Gaia-X ecosystems

there will be many ecosystems. how to start a decentralized one?



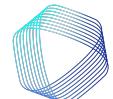
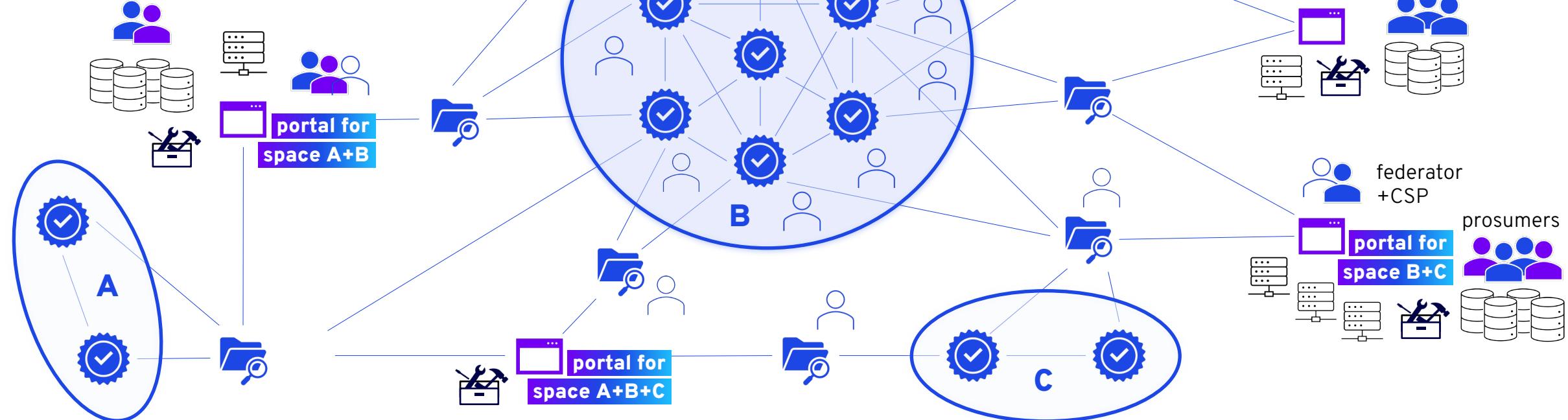
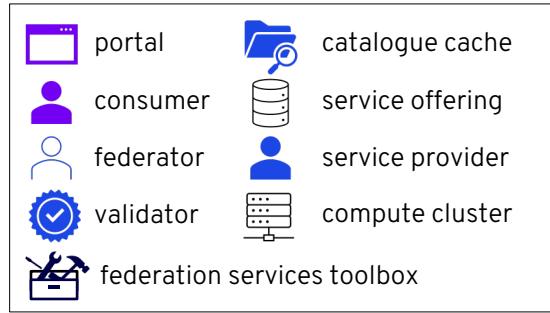
deltaDAO

| data economy solutions – GDPR compliant | contact@delta-dao.com

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bootstrapping Gaia-X ecosystems

a Web 3.0 ecosystem



vision Gaia-X & European data economy / data act

fairness
&
competitiveness

GDPR-compliance
&
data security

increase access,
lower barriers
& transaction costs

minimize lock-in
&
open-source software

incentives to share
&
incentives to collaborate

enable investments,
foster innovation,
& fair returns

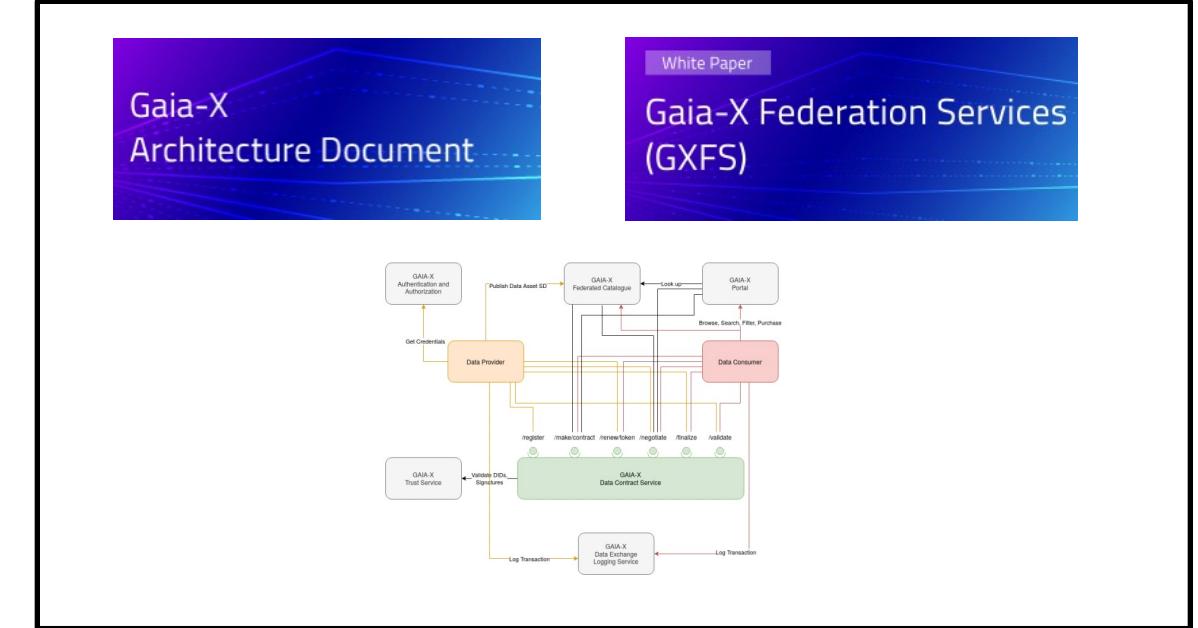
auditability,
provenance &
transparency

open private data
&
increase B2B use

reduce fragmentation
& EU-wide regulatory
framework

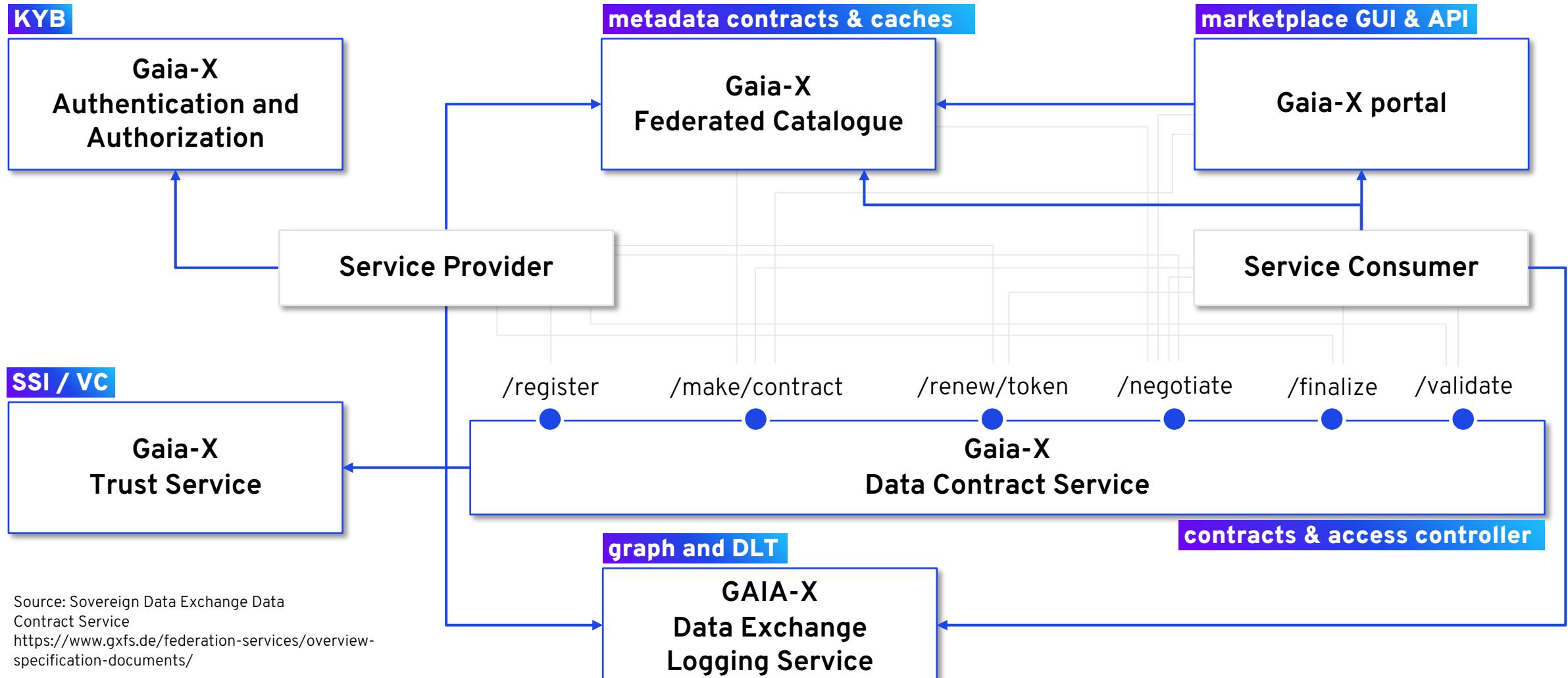
our starting point

expectation vs. reality



exceptional & necessary

Gaia-X federation services & the Minimal Viable Gaia-X



bootstrapping Gaia-X ecosystems

guiding principles



reuse existing software as much as possible

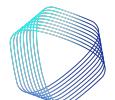
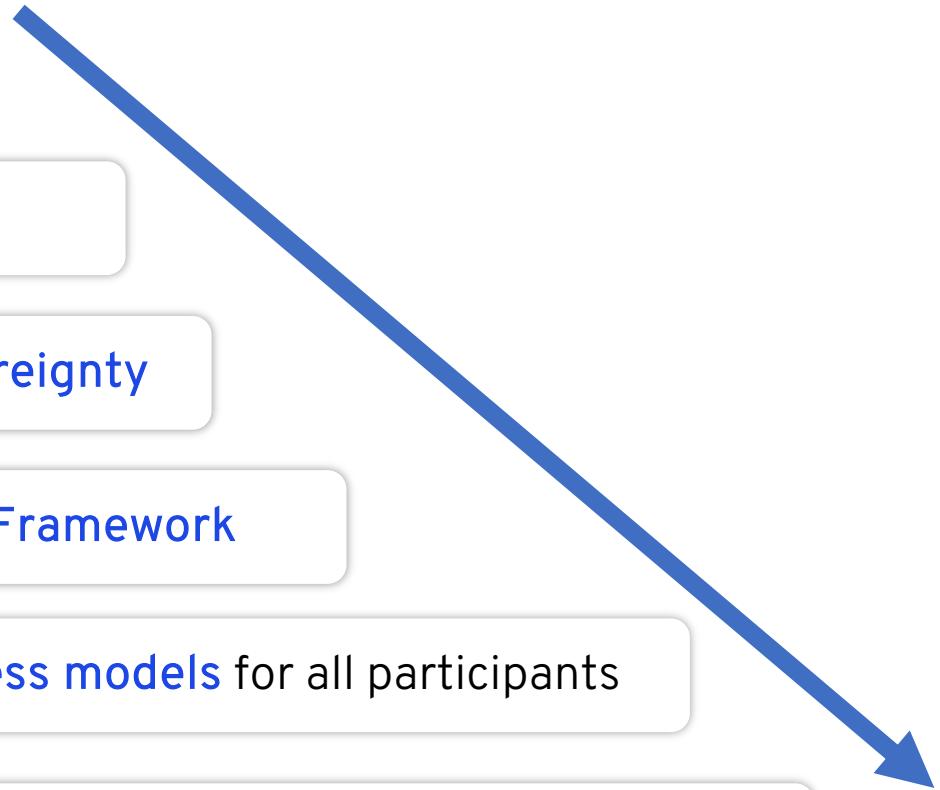
be transparent, use free open-source

enable technical data sovereignty

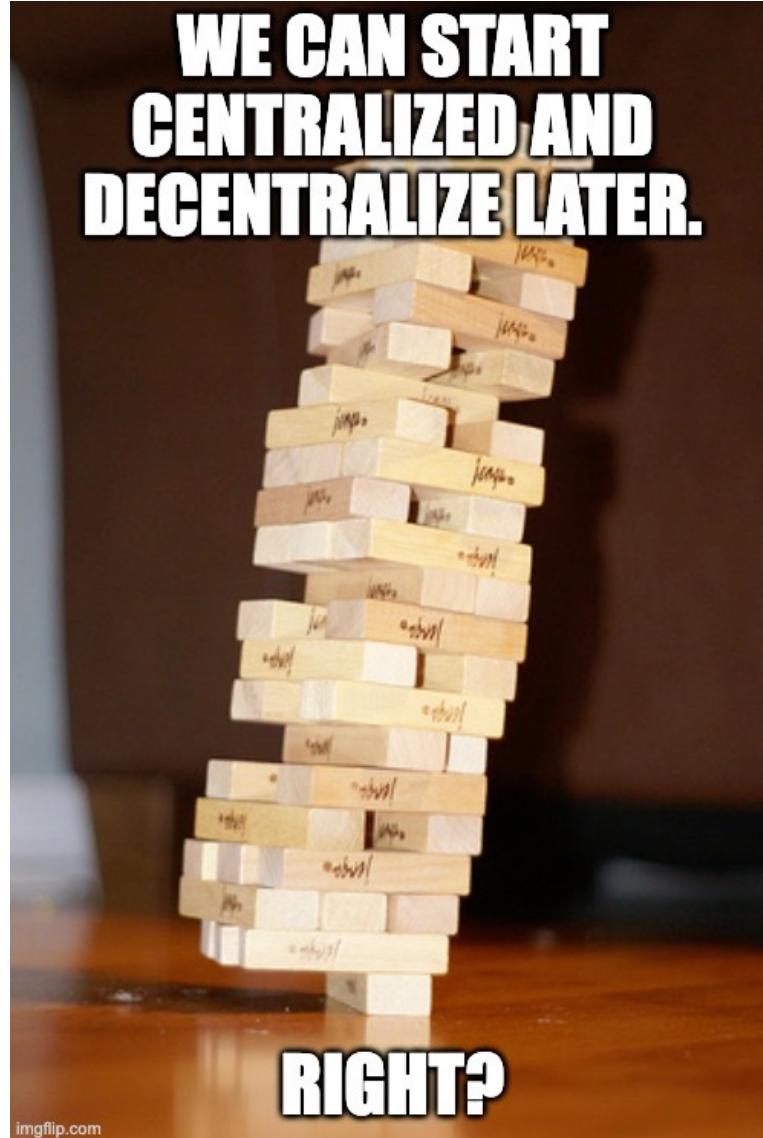
enable Gaia-X Trust Framework

sustainable business models for all participants

no lock-in, no central point of failure or control



why decentralized?



It is very hard to decentralize later.

why early decentralization is key

Main challenges: **Coordination problems & lack of trust**

Could we not build **one platform** then and be done with it?

Unique: **Data is non-rival in use and non-exhaustible**. Its value grows with usage.

This has substantial **consequences for competition policy** and **value distribution**!

Virtual markets have **low friction**. This leads to **strong concentration** processes.

Economies of scale are a strong driver of concentration.

economics of data ecosystems

Capacity constraints leading to competition **do not apply** as in the physical world.

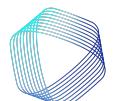
Subsidies allow **first movers to capture a large market share**.

High switching costs generate a **lock-in effect** and can be exploited by platform owners.

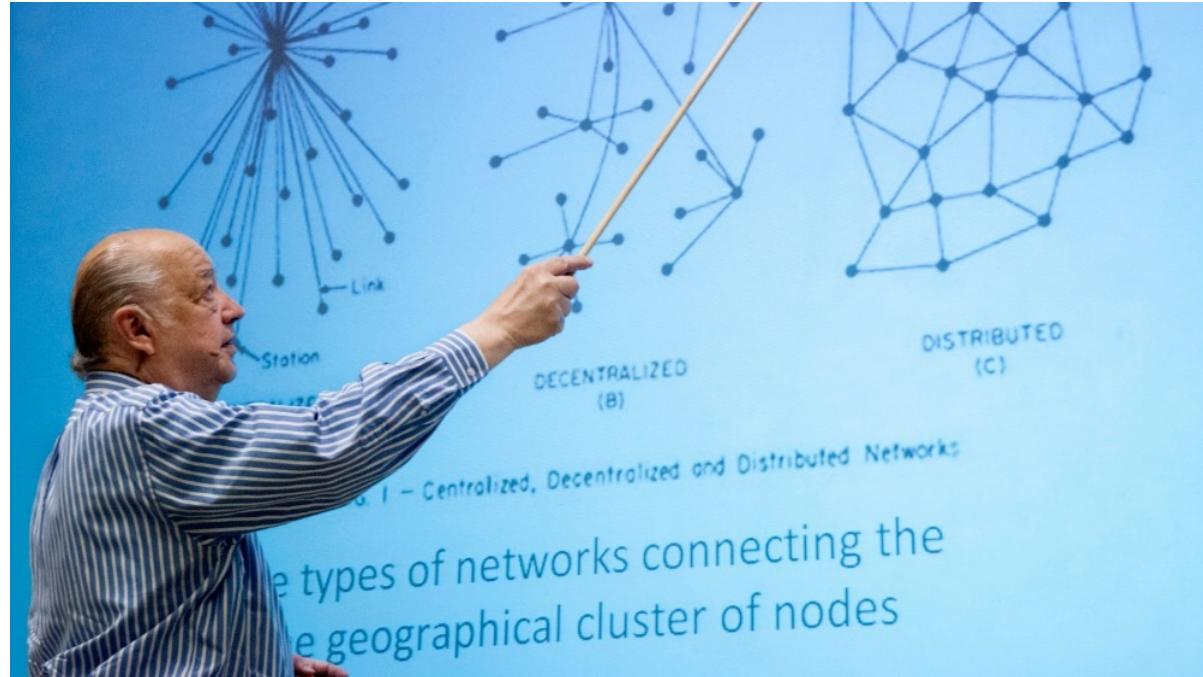
Hence, direct and indirect network effects plus economies of scale often give rise to
'winner-takes-all markets' or 'tippy markets' - which are hard to impossible to reverse.

Emerging **gatekeepers** will "regulate" competition to their favor. This is a B2B environment.

Incentive Design & competition are **critical success factors for sustainability & security**.



Distribution leads to resilience and reduces dependencies



Paul Baran presents his work at a RAND Alumni Association event on July 25, 2009
Photo by Diane Baldwin/RAND Corporation

Paul Baran's seminal 1964 article "On Distributed Communications Networks"

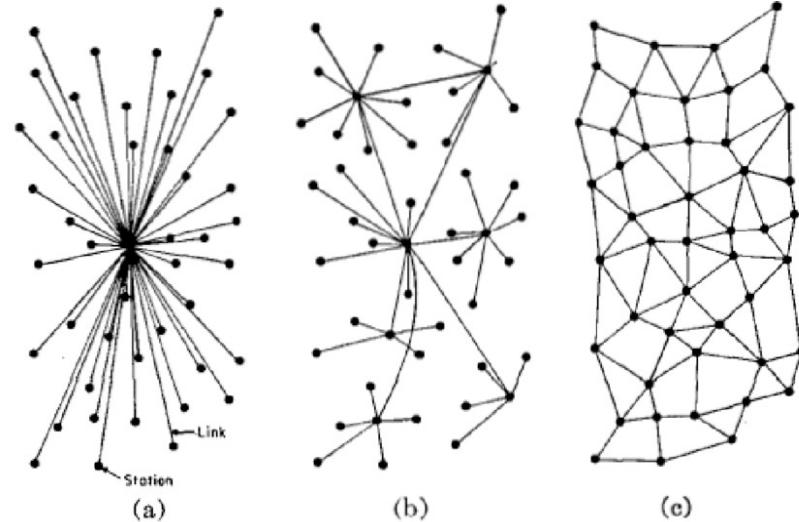
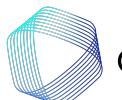
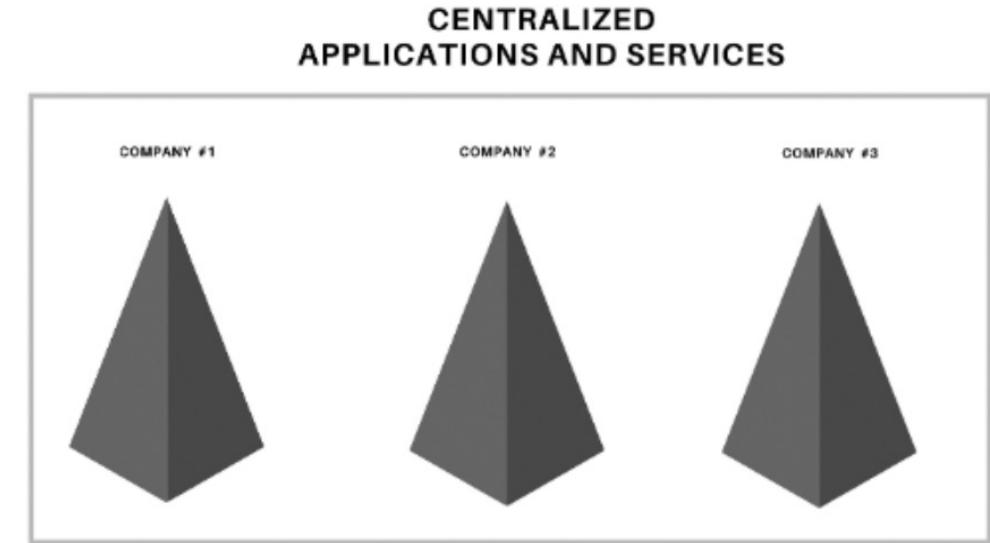
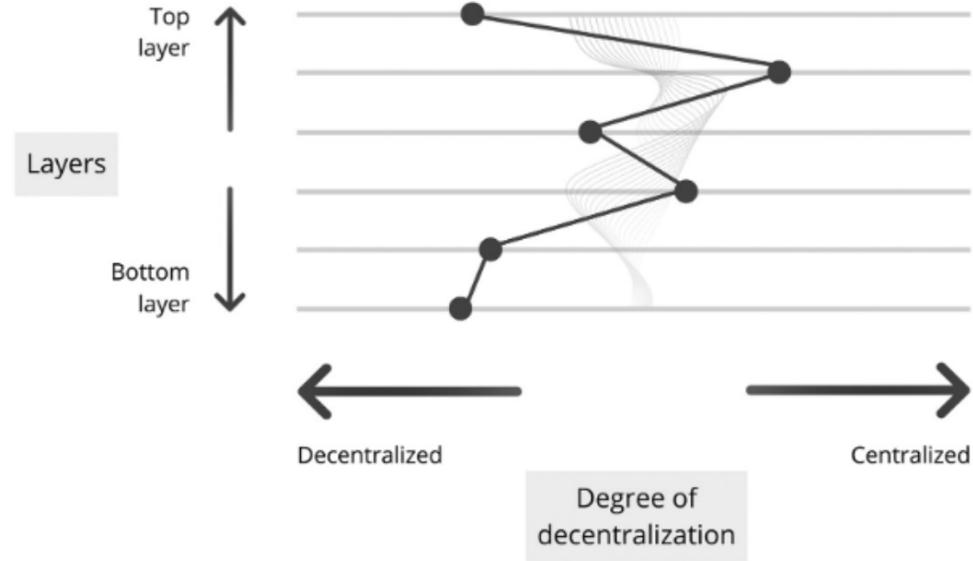


Fig. 1—(a) Centralized. (b) Decentralized. (c) Distributed networks.

Centralization can be an expensive liability.



Decentralization. Spectrum across layers from tech to governance.

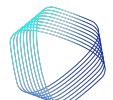


Thibault Schrepel, Blockchain + Antitrust, <https://doi.org/10.4337/9781800885530>

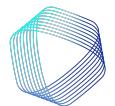
Companies work differently...

Benefits of using Web3.0 technology

Web 1.0 (1980 - 2005)	Web 2.0 (2005 - 2020)	Web 3.0 (2020+)
Open Protocols	Siloed Services	Open Protocols
Decentralized	Centralized	Decentralized, Distributed
Dedicated Infrastructure	Cloud Computing	Distributed Computing
Community-Governed	Governed by few entities	Community-governed
Content owned by users	Content owned few entities	Content owned by users
Read Only	Read-Write	Read-Write-Own
Page Views	Cost-per-Click	Token Economics
Static Content	Dynamic Content	Interoperable Content



portal.minimal-gaia-x.eu



bootstrapping Gaia-X ecosystems

made with love and 100% free open-source technology



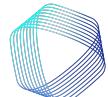
VMware Tanzu™



ocean



Swagger™



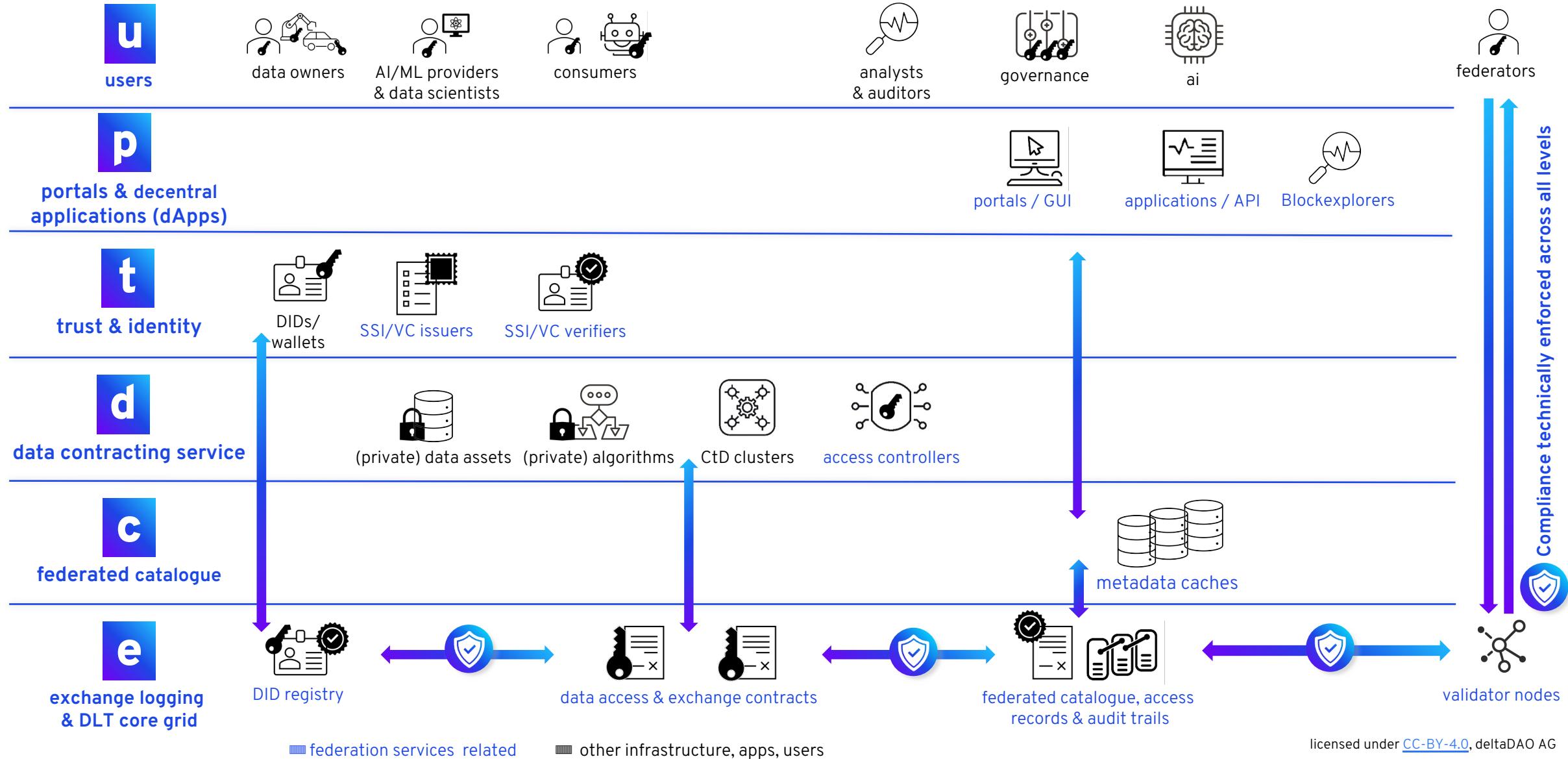
deltaDAO

| data economy solutions – GDPR compliant | contact@delta-dao.com

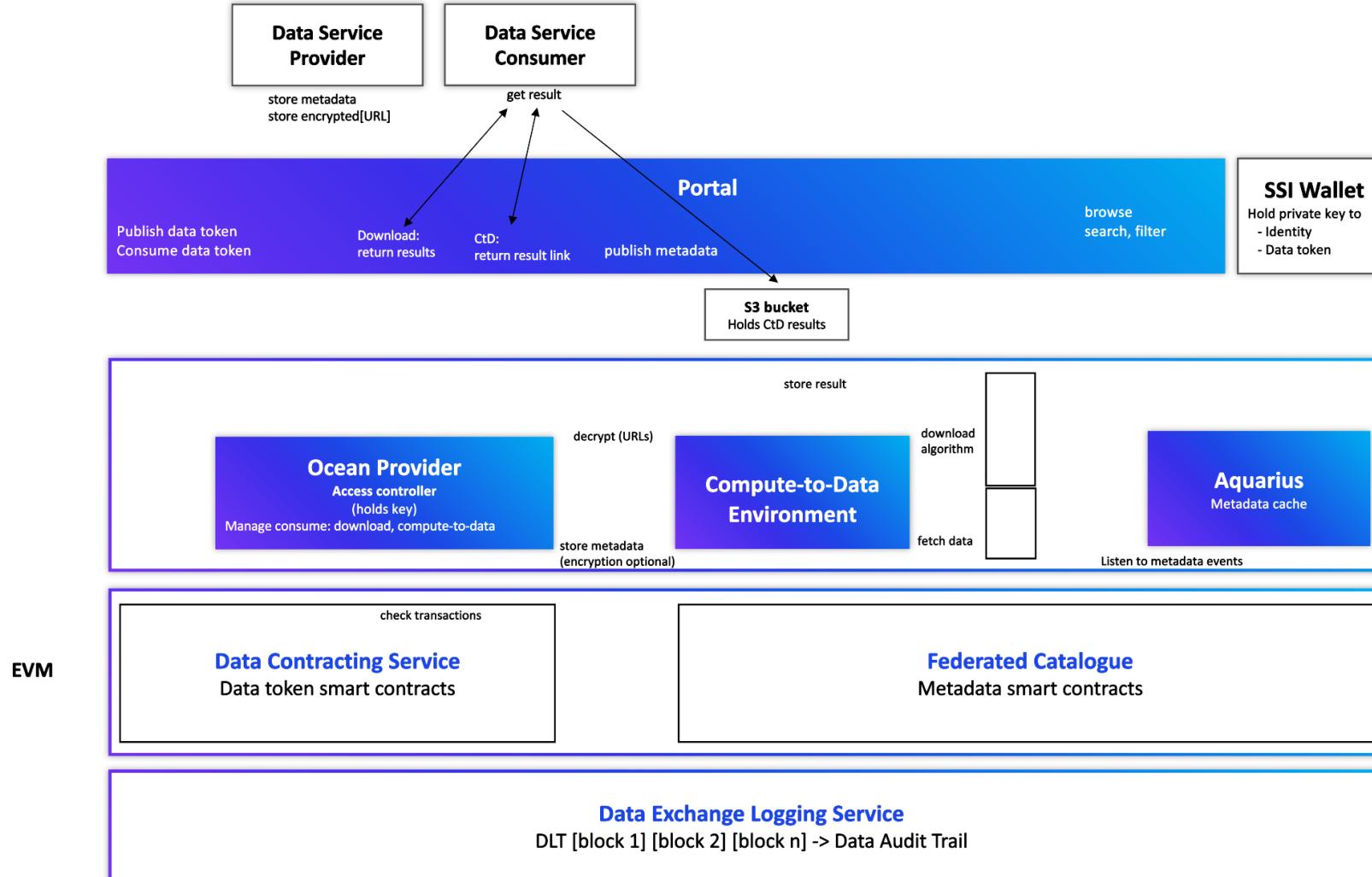
licensed under [CC-BY-4.0](https://creativecommons.org/licenses/by/4.0/), deltaDAO AG

bootstrapping Gaia-X ecosystems

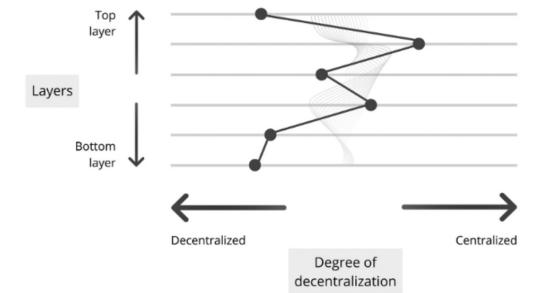
MVP Gaia-X Federation Services & Decentralized Core Grid



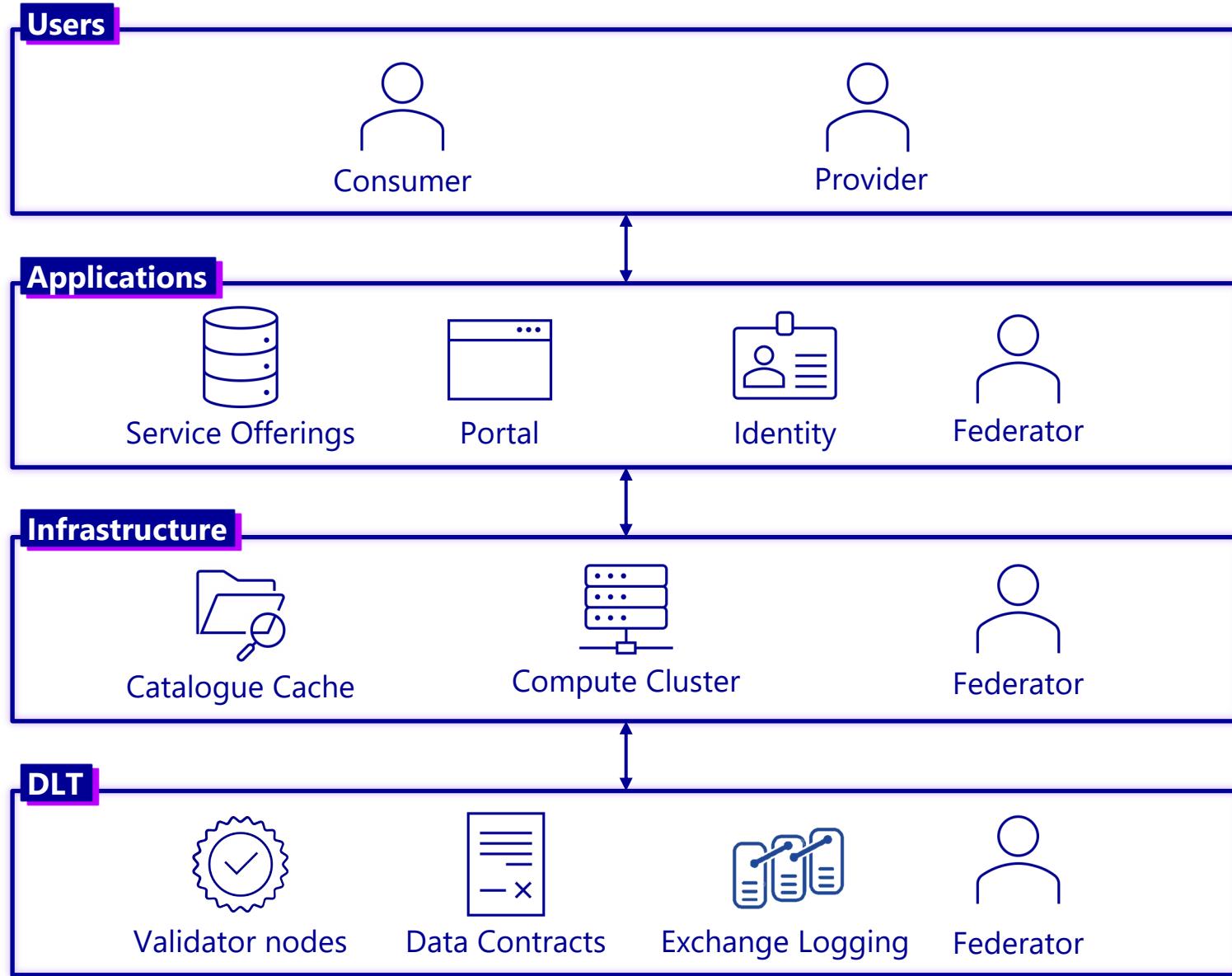
deep dive #1



Decentralization & Distribution
across all layers



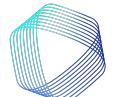
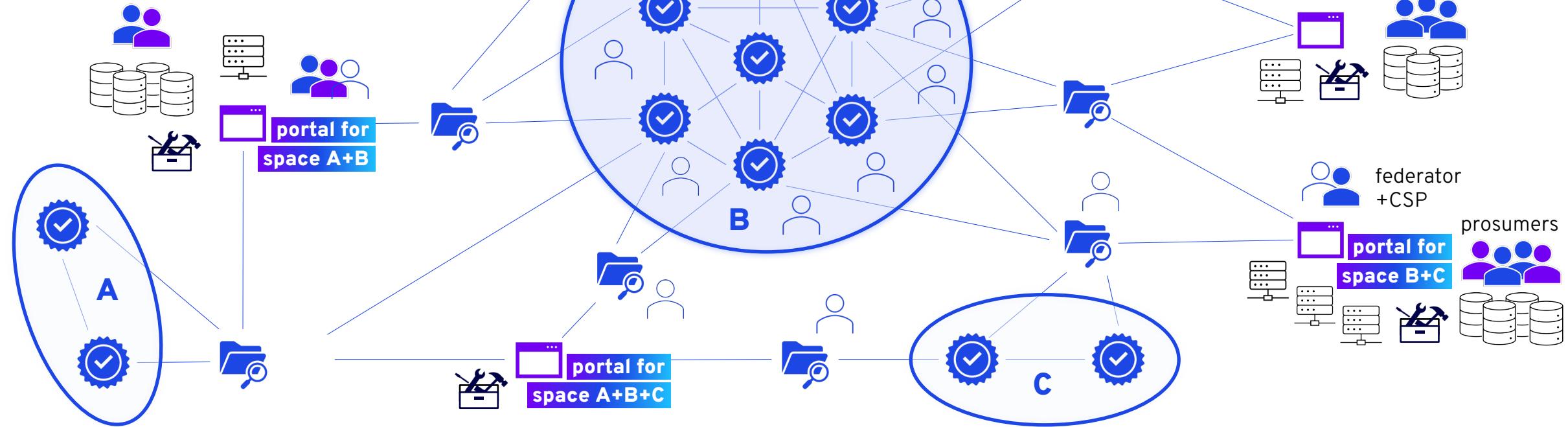
MVG ecosystem



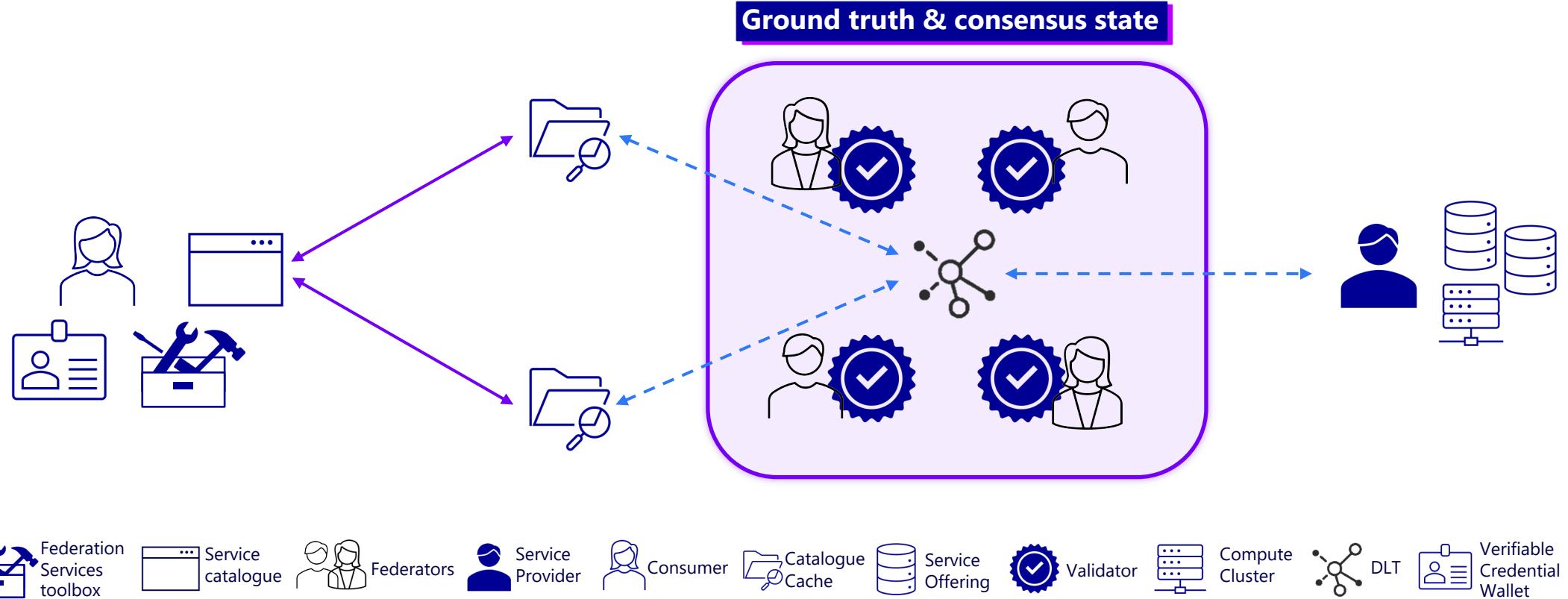
bootstrapping Gaia-X ecosystems

creation and connection of complex services from atomic and elementary services

	portal
	consumer
	federator
	validator
	federation services toolbox

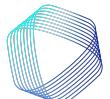
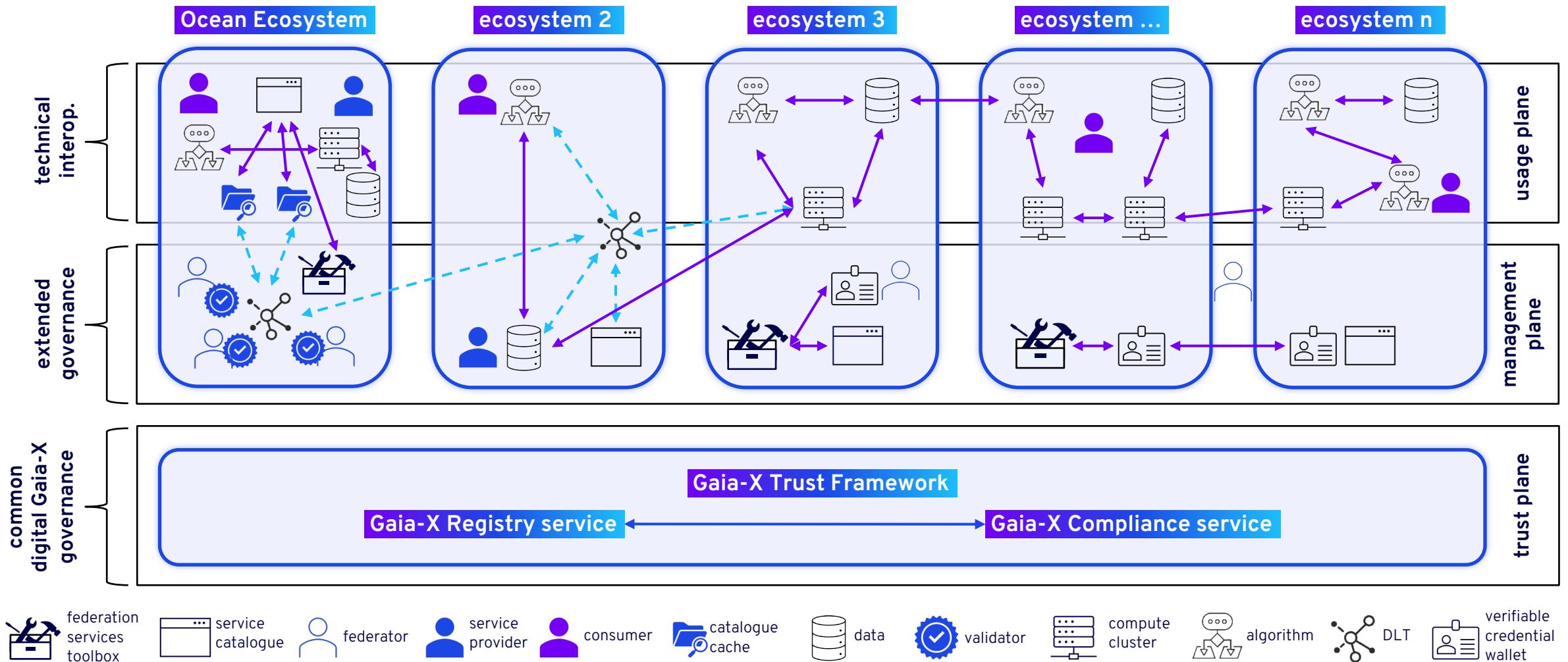


remove all single points of failure from the federation



bootstrapping Gaia-X ecosystems

federation of interoperable autonomous Gaia-X ecosystems



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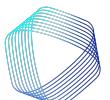
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Minimal Viable Gaia-X portal

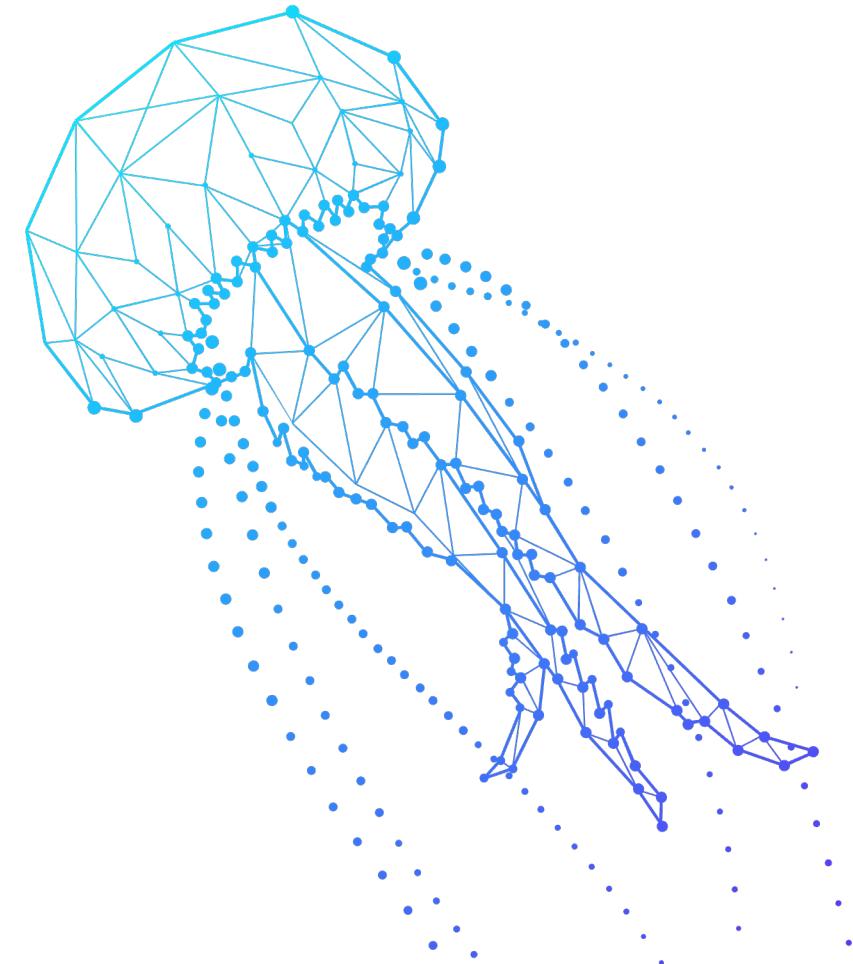


ocean

powered by
Ocean Protocol



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Hackathon #1 - First Minimal Viable Gaia-X Demonstrator

A screenshot of the MVG Portal Demonstrator website. The top navigation bar includes "Publish", "Profile", a search icon, "Connect Wallet", and a settings icon. The main title is "MVG Portal Demonstrator" with the subtitle "A platform to find, publish and consume Data Services in the Gaia-X Test Network." Below this, it says "powered by" and shows the Ocean Protocol logo. A large blue banner at the bottom left features a purple play button icon and the text "START NOW". To the right of the banner, there's a section titled "Gaia-X on Ocean Protocol Academy" with a description of the platform's aims. On the far right of the banner, two URLs are displayed in blue boxes: "<https://portal.minimal-gaia-x.eu>" and "Video: <https://youtu.be/R49CXPTRamg>".

<https://portal.minimal-gaia-x.eu>

Video: <https://youtu.be/R49CXPTRamg>

Medium [Minimal Viable Gaia-X blogpost](#)

bootstrapping Gaia-X ecosystems

for F.A.I.R. science and to connect researchers & businesses



Development build of the Universitat de Lleida portal for the Gaia-X hackathon #2.

Universitat de Lleida

Search... Connect Wallet

publish account browse

UDL Science and Research Portal

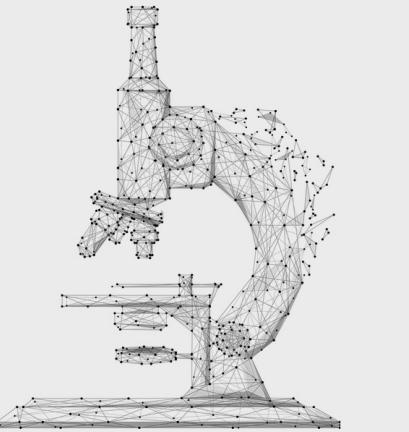
An open research and science platform following the FAIR guiding principles of findability, accessibility, interoperability and reusability.

powered by Ocean Protocol

 ocean

Goal

The Universitat de Lleida MVG Portal aims to accelerate the progress of research and science, increase the quality of data, and foster collaboration between research and educational institutions. On the research portal, data scientists and researchers can find, consume and share research data sets and algorithms. Depending on the publisher's decision, the data assets can be consumed either by granting compute or download access to the data assets.



<https://udl.portal.minimal-gaia-x.eu>



deltaDAO | data economy solutions – GDPR compliant | contact@delta-dao.com

Medium [UDL blogpost](#)

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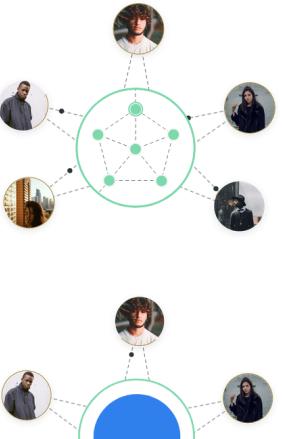
for SMEs and GDPR-compliant data usage

Development build of the foreverontheblockchain portal for the Gaia-X hackathon #2.

foreverontheblockchain account browse Search... <https://forever.portal.minimal-gaia-x.eu>

GDPR compliant data monetization with Compute-to-Data

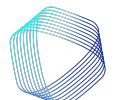
powered by Ocean Protocol



01 compute-to-data

Compute-to-Data, powered by Ocean Protocol, enables privacy-preserving data monetization for anyone. A trusted algorithm is brought to the data and is executed on-premise while the data always stays with us. We keep full ownership and control while you are invited to obtain valuable insights from our customer base. Ocean Protocol solves the trade-off between monetizing private data and the risk of exposing it while being fully

Medium [foreverontheblockchain Blogpost](#)



for regulators and the finance industry



Development build of the safeFBDC portal for the Gaia-X hackathon #2.

safeFBDC Portal account browse Search... Connect Wallet ⚙️

powered by Ocean Protocol

ocean

20
21

safe FBDC

Our vision Our vision of FBDC is a federated ecosystem that provides business, academic, and regulatory stakeholders with a secure, data sovereignty-preserving infrastructure for the exchange and AI-powered mobilization of financial data.

- We develop, prototype, and validate infrastructures for the processing and secure exchange of financial data.
- We ensure that data owners retain sovereignty over their data.
- We develop AI-powered applications to process, exploit, and monetize distributed datasets based on various use cases.
- We ensure the compatibility of our structures and developments with the requirements of the markets and with important data structures under development, such as Gaia-X or International Data Spaces.

<https://safefbdc.portal.minimal-gaia-x.eu>

20
21

Background

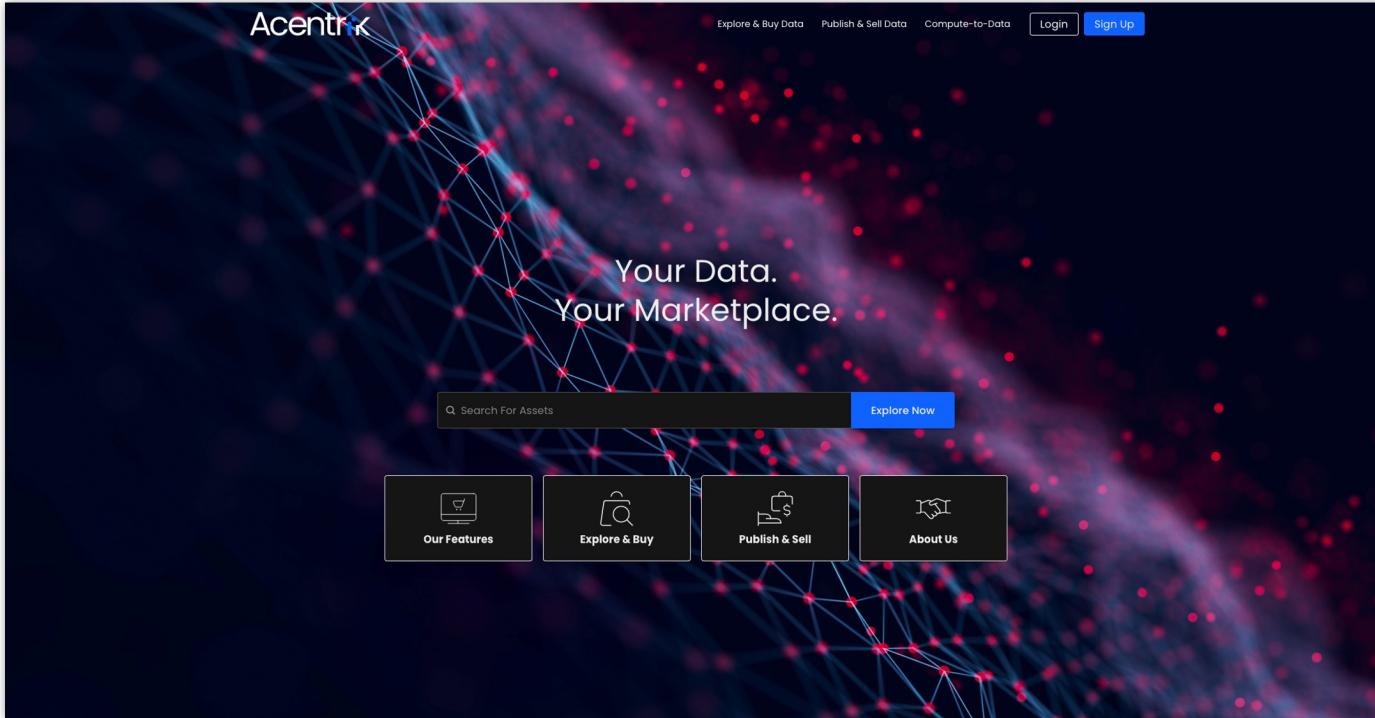
safeFBDC is a research project funded by the Federal Ministry for Economic Affairs and Energy (BMWi) with a three-year project duration (2021-2023). The consortium under the leadership of TechQuarter consists of eleven founding and 30+ associated partners covering a large part of the German financial industry and beyond.

20



bootstrapping Gaia-X ecosystems

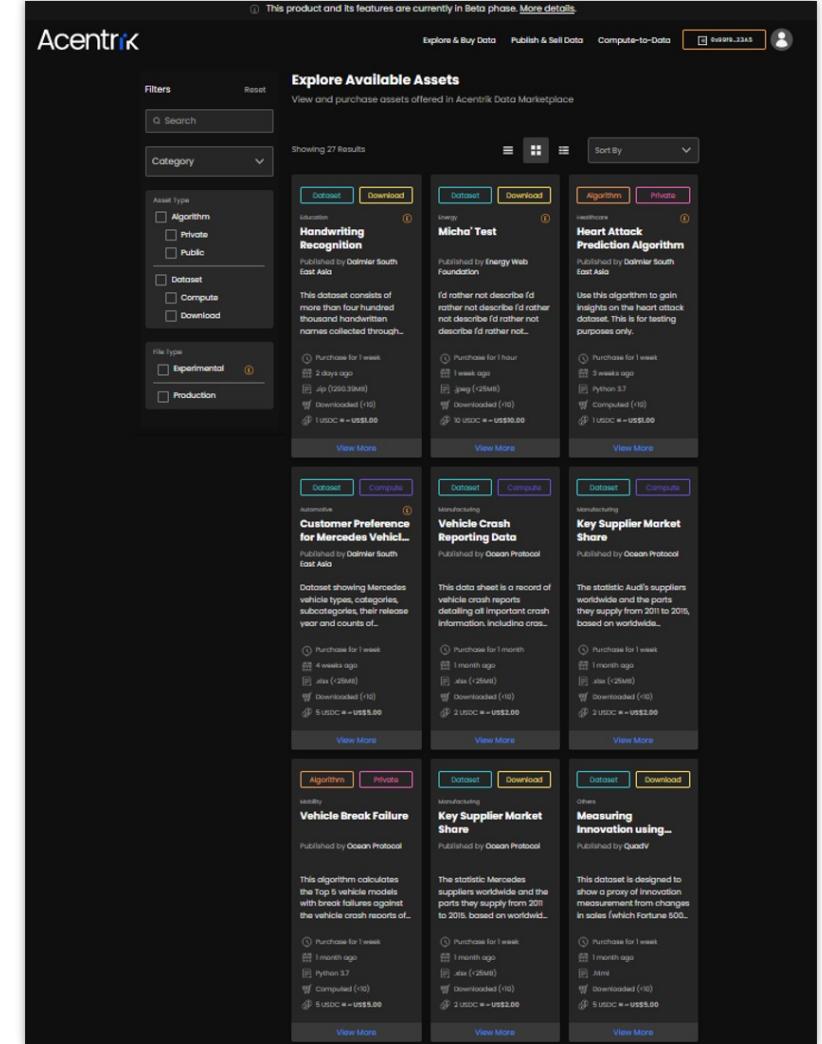
for enterprise marketplaces and cloud service providers



The screenshot shows the Acentrik homepage with a dark background featuring a network of red and blue dots. The title "Your Data. Your Marketplace." is centered. At the top right are "Login" and "Sign Up" buttons. Below the title are "Explore & Buy Data", "Publish & Sell Data", and "Compute-to-Data" buttons. A search bar and a "Explore Now" button are at the bottom left. Four dark buttons labeled "Our Features", "Explore & Buy", "Publish & Sell", and "About Us" are at the bottom right.

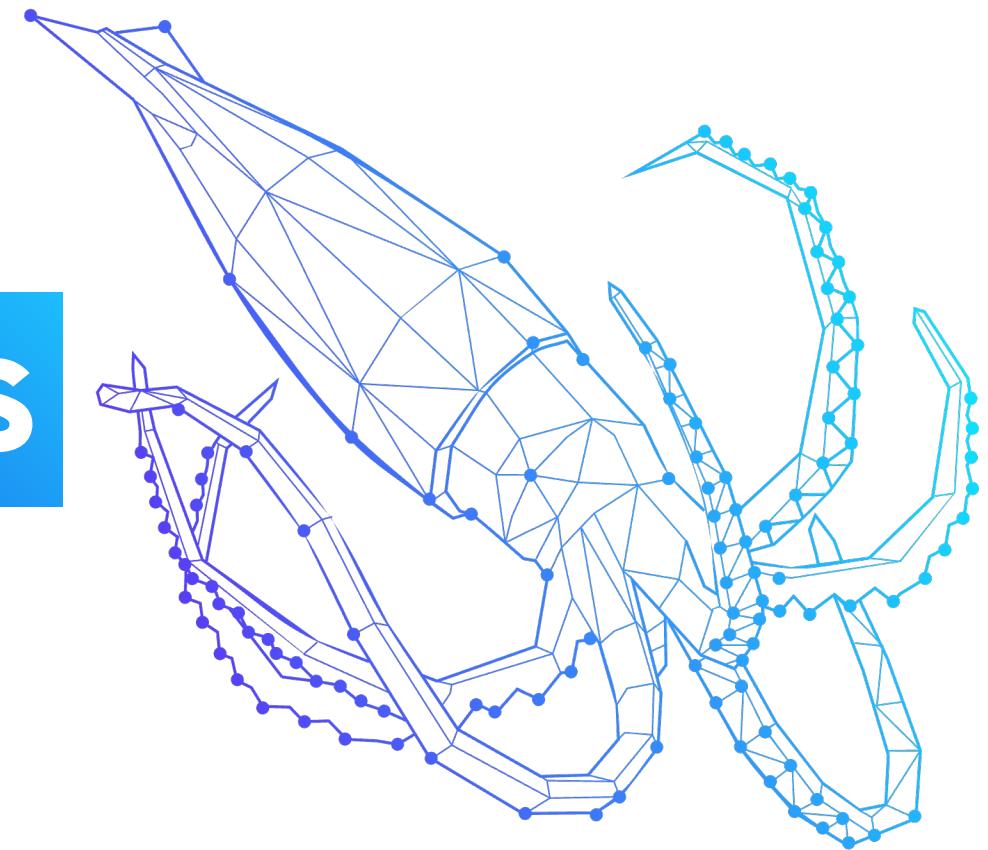
<https://sandbox.acentrik.io/>

Medium [Acentrik blogpost](#)



The screenshot shows the "Explore Available Assets" page in the Acentrik Data Marketplace. It includes a header with user information and a "Filters" section. The main area displays a grid of asset cards. One card for "Handwriting Recognition" is detailed: it's a dataset published by Daimler South East Asia, consisting of over 400,000 handwritten names, with purchase and download options. Other cards include "Micha's Test" (algorithm), "Heart Attack Prediction Algorithm" (algorithm), "Customer Preference for Mercedes Vehicles" (dataset), "Vehicle Crash Reporting Data" (dataset), "Vehicle Break Failure" (algorithm), "Key Supplier Market Share" (dataset), and "Measuring Innovation using..." (dataset).

Minimal Viable Gaia-X Features



decentralized catalogue, minutes to publish and consume



gaia-x

104 results

DATASETS **ALGORITHMS** **CATEGORIES**

		SORT	Published
FULL - Copernicus Sentinel Data Fusion with CNES Orfeo toolbox (Algorithm)	TENANE-58	ALGORITHM	1 OCEAN
QUICK - Copernicus Sentinel Data Fusion with CNES Orfeo toolbox (Algorithm)	STUJEL-8	ALGORITHM	1 OCEAN
Copernicus Sentinel Data Fusion with CNES Orfeo toolbox (Dataset)	INVDOL-81	DATA SET	1 OCEAN
Provider tests	PERWHA-66	ALGORITHM	1 OCEAN
Provider test	BILCOD-50	DATA SET	1 OCEAN
Bids test	VIBSEA-6	ALGORITHM	1 OCEAN
Test Dataset	GENSHA-68	DATA SET	1 OCEAN
Foreverontheblockchain Algorithm	JUDSTA-51	ALGORITHM	1 OCEAN
Foreverontheblockchain Dataset	QUICLA-8	DATA SET	1 OCEAN
Yolov5 Algorithm	CONWHA-61	ALGORITHM	1 OCEAN
Yolov5 Dataset examples	DOWLIN-26	DATA SET	1 OCEAN
QUICK - Copernicus Sentinel Data Fusion with CNES Orfeo toolbox	ADACUT-79	ALGORITHM	1 OCEAN
FULL - Copernicus Sentinel Data Fusion with CNES Orfeo toolbox	ADACUT-79	ALGORITHM	1 OCEAN
Data Fusion Dataset - Copernicus Sentinel-1 SLC IW and Sentinel 2 L2A	HUBHER-51	DATA SET	1 OCEAN

gaia-x

Publish

Highlight the important features of your data set or algorithm to make it more discoverable and catch the interest of data consumers.

Publishing Data Set

Successfully published. Show create a price on your data set.

GO TO DATA SET →

Collected Form Values

```
{
  "name": "",
  "author": "",
  "dataTokenConditions": {
    "name": "",
    "symbol": ""
  }
}
```

YOLOv5 Image Classification Sample Data (POC)

GAIA-X Testnet

DATA SET | Inspired Lobster Token — INSLOB-11

Published By 0x68C...246B
5 days ago — updated 5 days ago

Service Online / Available
Type Machine Learning
Domain Mobility

About this Data Service Offering

This data service offering consists of data for a real-time object detection algorithm, which identifies specific objects in a sample set of videos and images. The algorithm uses features learned by a deep convolutional neural network to detect an object.

The YOLOv5 algorithm is listed in the [Minimal Viable Gaia-X Portal](#) here.

This data service can be translated to many other use cases, i.e. traffic detection, smart cities, agricultural use cases etc.

About the Use Case

This use case demonstrates how algorithm and data providers can train and monetize their machine learning scripts by making them available in Gaia-X. At the same time consumers in Gaia-X can use existing and well-trained models for classification, analysis and forecasting without the need to share their data and/or acquire personnel or

USE

zp 73.25 MB ≈ €2.51

Select an algorithm to start a compute job

Search by title, datatoken, or DID...

YOLOv5 Object Classification Algorithm (POC) ↗
LoqPQR-49 | 0x68C1084681A0Cec7832896339144724bcCC51981BE4460 5

You will pay 5 OCEAN ⓘ

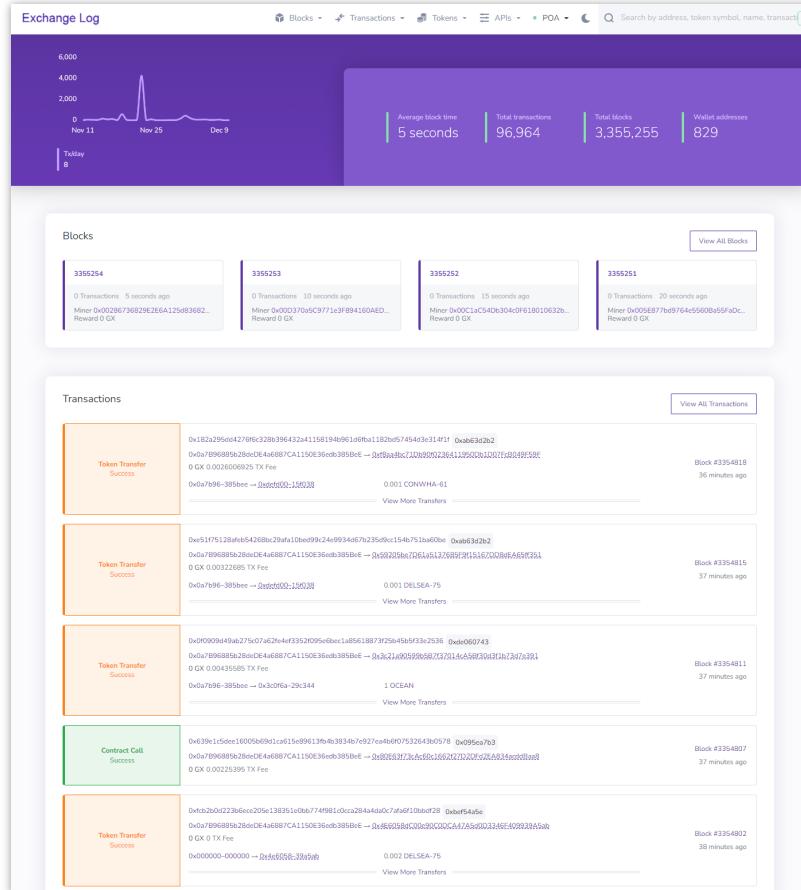
BUY COMPUTE JOB

You do not have enough OCEAN in your wallet to purchase this asset.

<https://catalogue.minimal-gaia-x.eu>

Tutorial: <https://youtu.be/eAbnM5bfEMc>

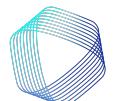
automatic audit trails & security & privacy by design



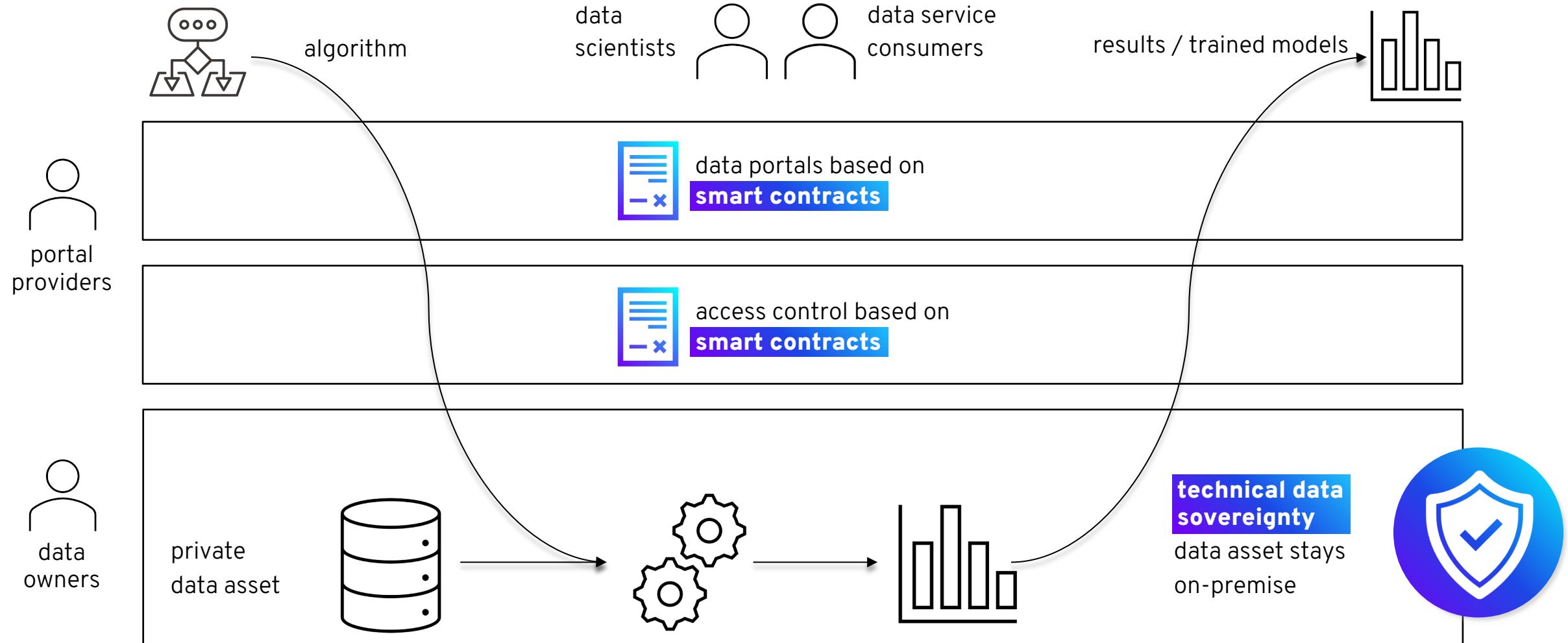
Transaction Details

<i>Transaction Hash</i>	0x182a295dd4276f6c328b396432a41158194b961d6fba1182bd57454d3e314f1f
<i>Result</i>	Success
<i>Status</i>	Confirmed
<i>Block</i>	3354818
<i>Timestamp</i>	3 hours ago December-12-2021 06:25:50 PM +1 UTC Confirmed within <= 5.0 seconds
<i>From</i>	0x0a7b96885b28dede4a6887ca1150e36edb385bee
<i>Interacted With (To)</i>	0xf8aa4bc71db90f0236411950db1d07fc049f59f
<i>Tokens Transferred</i>	<p>From 0x0a7b96885b28dede4a6887ca1150e36edb385BeE</p> <p>To 0x3c0f6a52c84A79eBC52C56Ff8C029a30F929C344</p> <p>For 0.998 CONWHA-61</p> <p>From 0x0a7b96885b28dede4a6887ca1150e36edb385BeE</p> <p>To 0x9984b2453eC7D99a73A5B3a46Da81f197B753C8d</p> <p>For 0.001 CONWHA-61</p> <p>From 0x0a7b96885b28dede4a6887ca1150e36edb385BeE</p> <p>To 0xDefD0018969cd2d4E648209F876ADe184815f038</p> <p>For 0.001 CONWHA-61</p>
<i>Value</i>	0 GX
<i>Transaction Fee</i>	0.0022258425 GX
<i>Gas Price</i>	52.5 Gwei

<https://exchangelog.minimal-gaia-x.eu/>

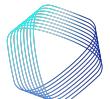
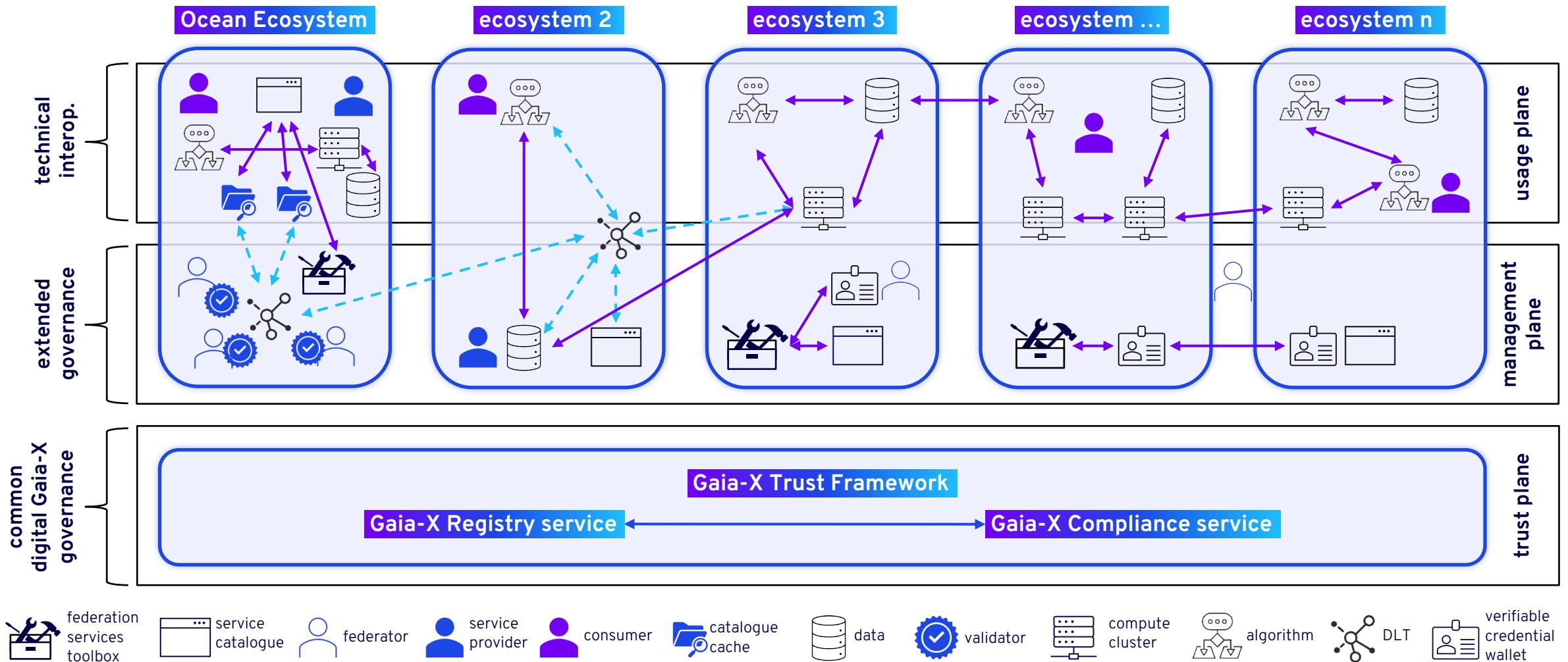


compute-to-data enables true technical data sovereignty



bootstrapping Gaia-X ecosystems

federation of interoperable autonomous Gaia-X ecosystems

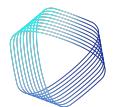
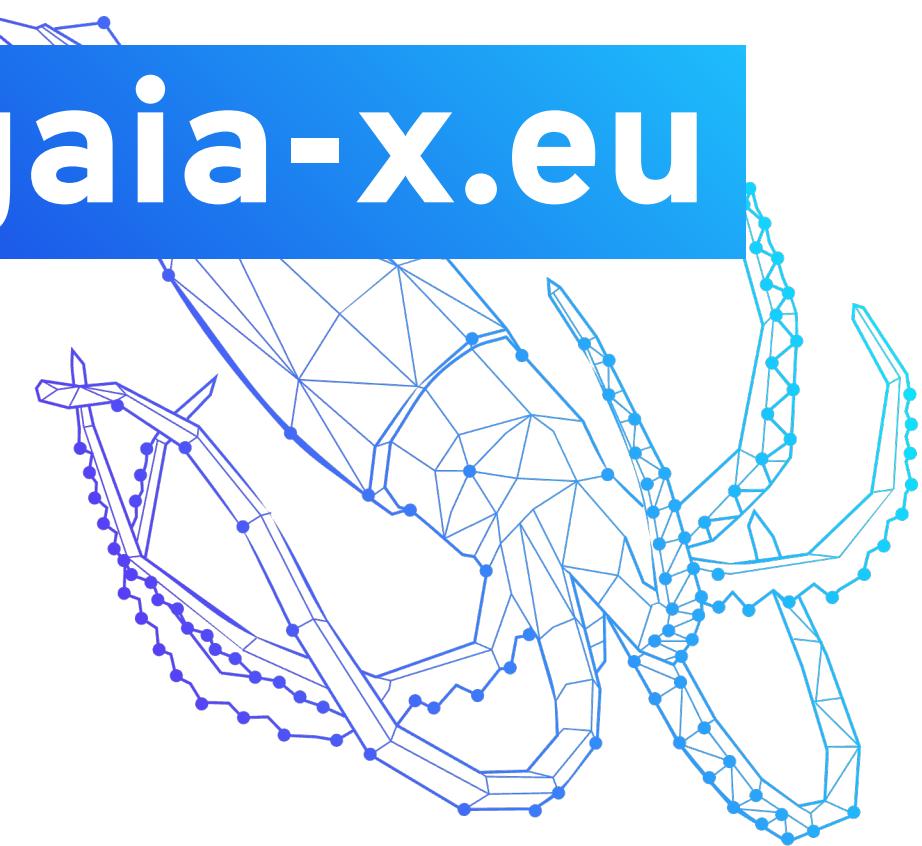


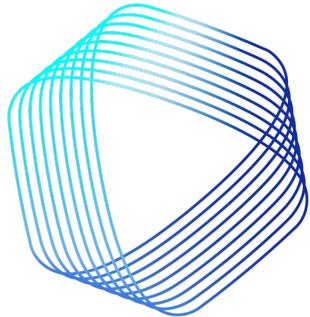
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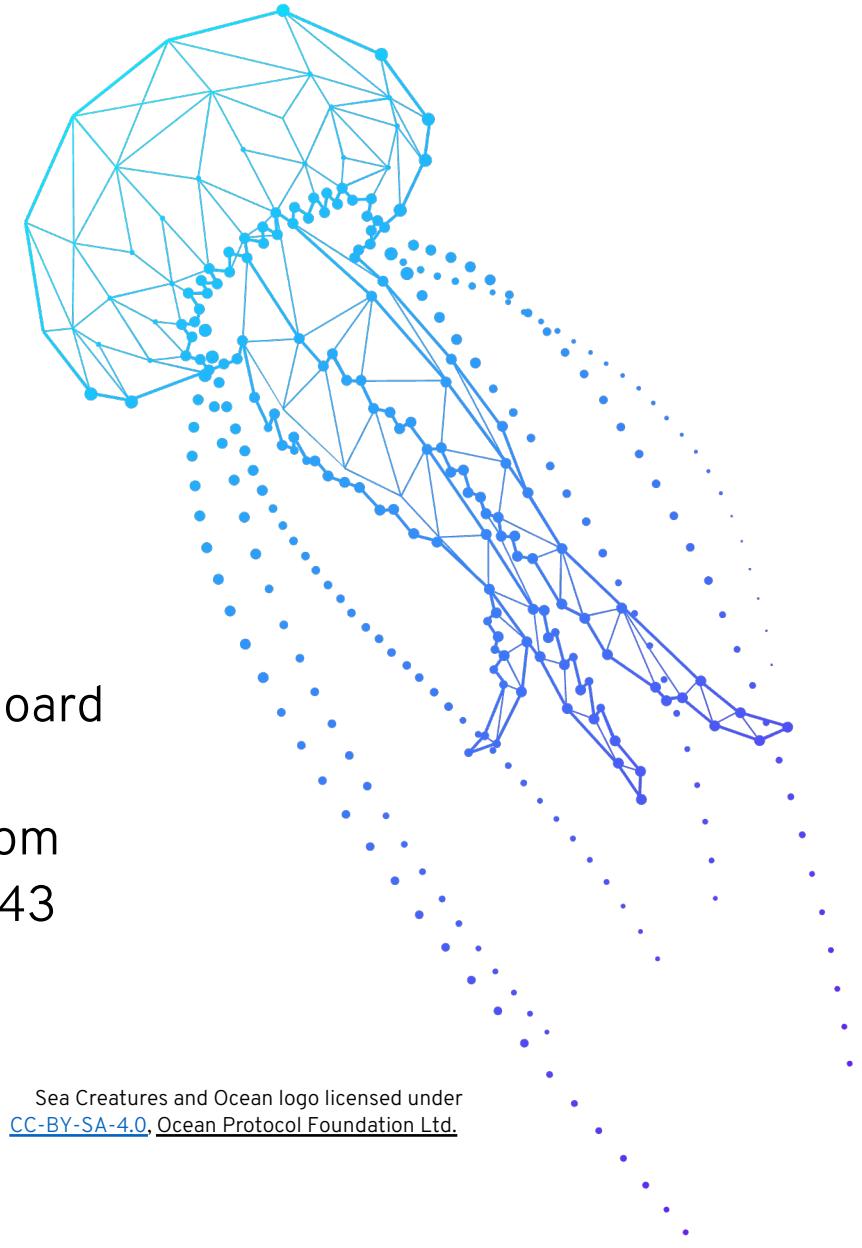
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