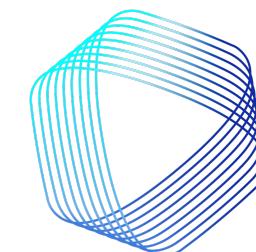
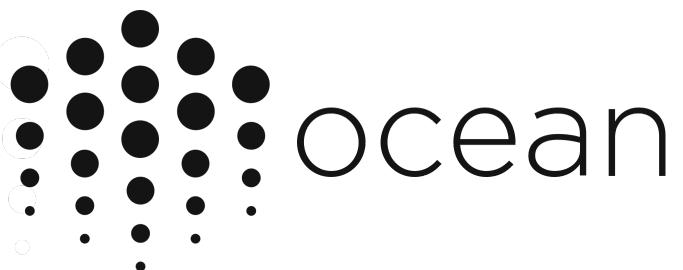
A large, abstract network graph composed of blue dots (nodes) and connecting lines (edges) is positioned on the left side of the slide. It has two main clusters: one at the top right and another at the bottom right. In the bottom right cluster, the word "ocean" is partially visible.

presentation

Bootstrapping

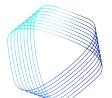
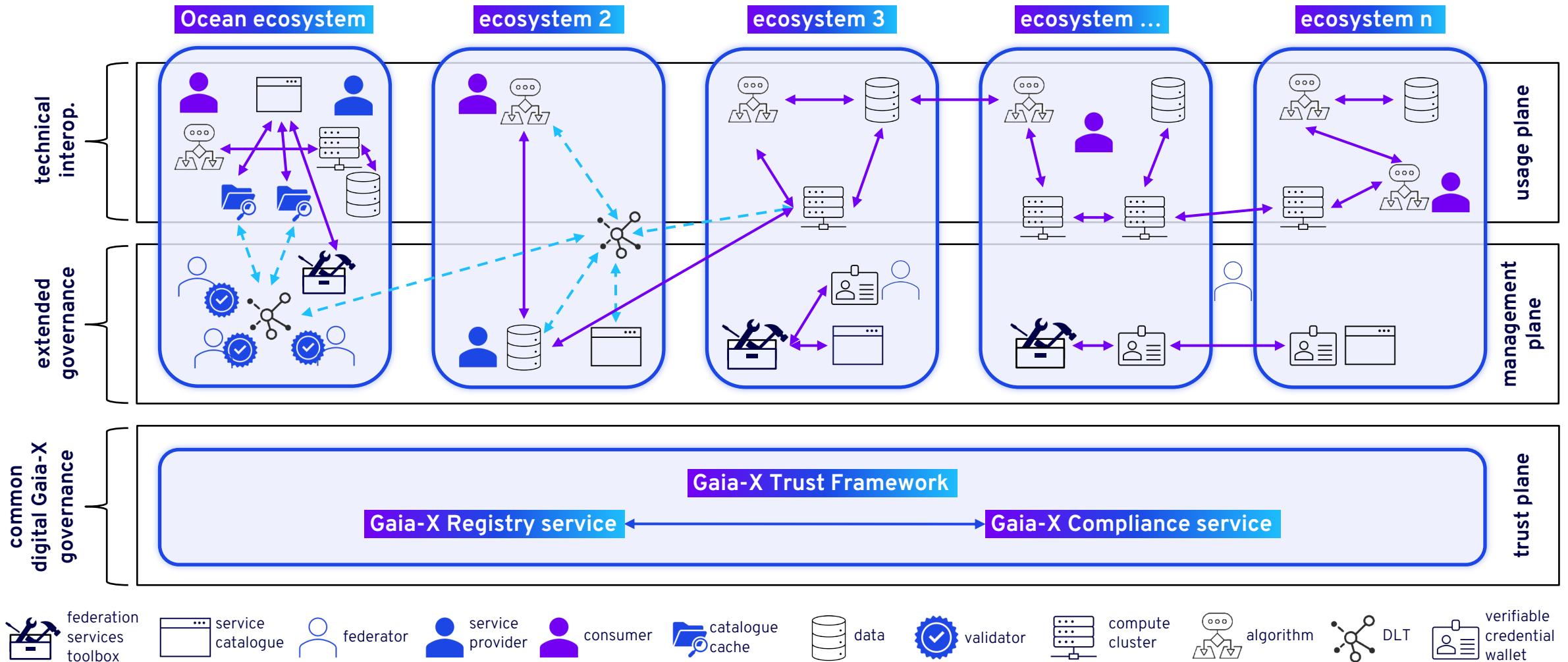
Gaia-X Ecosystems



deltaDAO

bootstrapping Gaia-X ecosystems

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



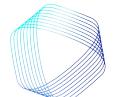
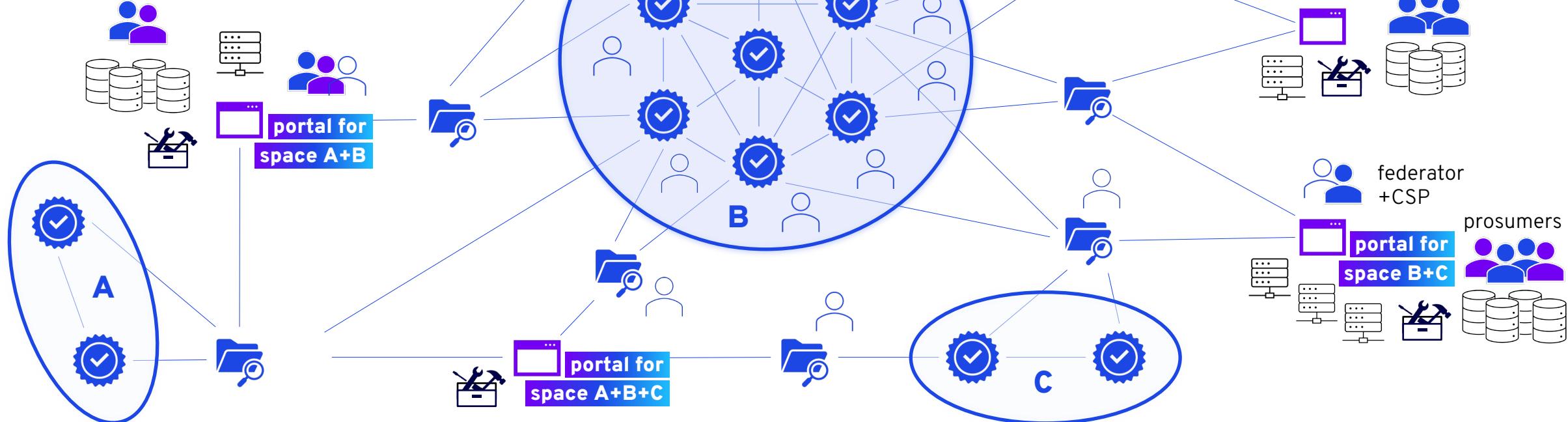
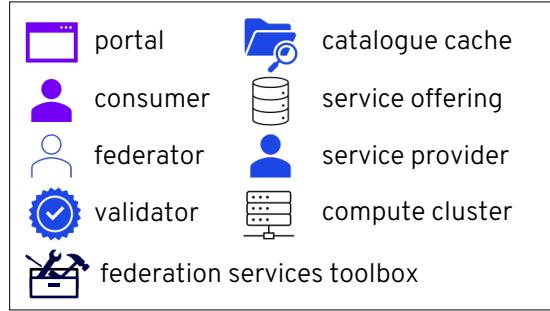
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bootstrapping Gaia-X ecosystems

a Web 3.0 ecosystem



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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

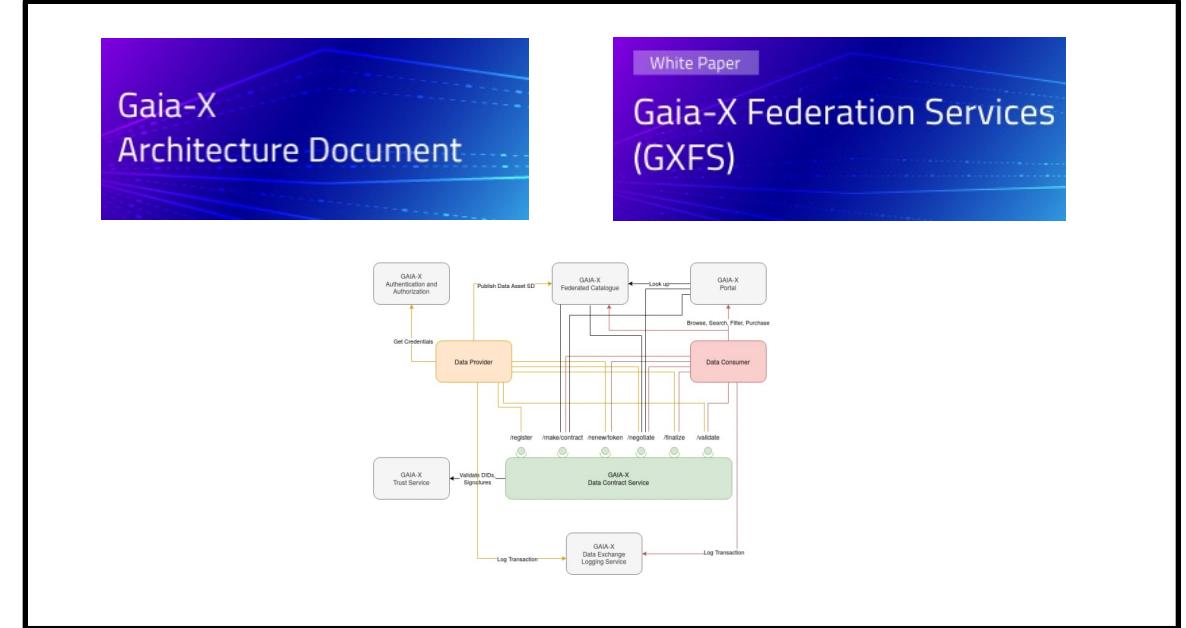
reduce fragmentation
& EU-wide regulatory
framework

our starting point

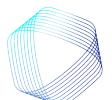
expectation vs. reality



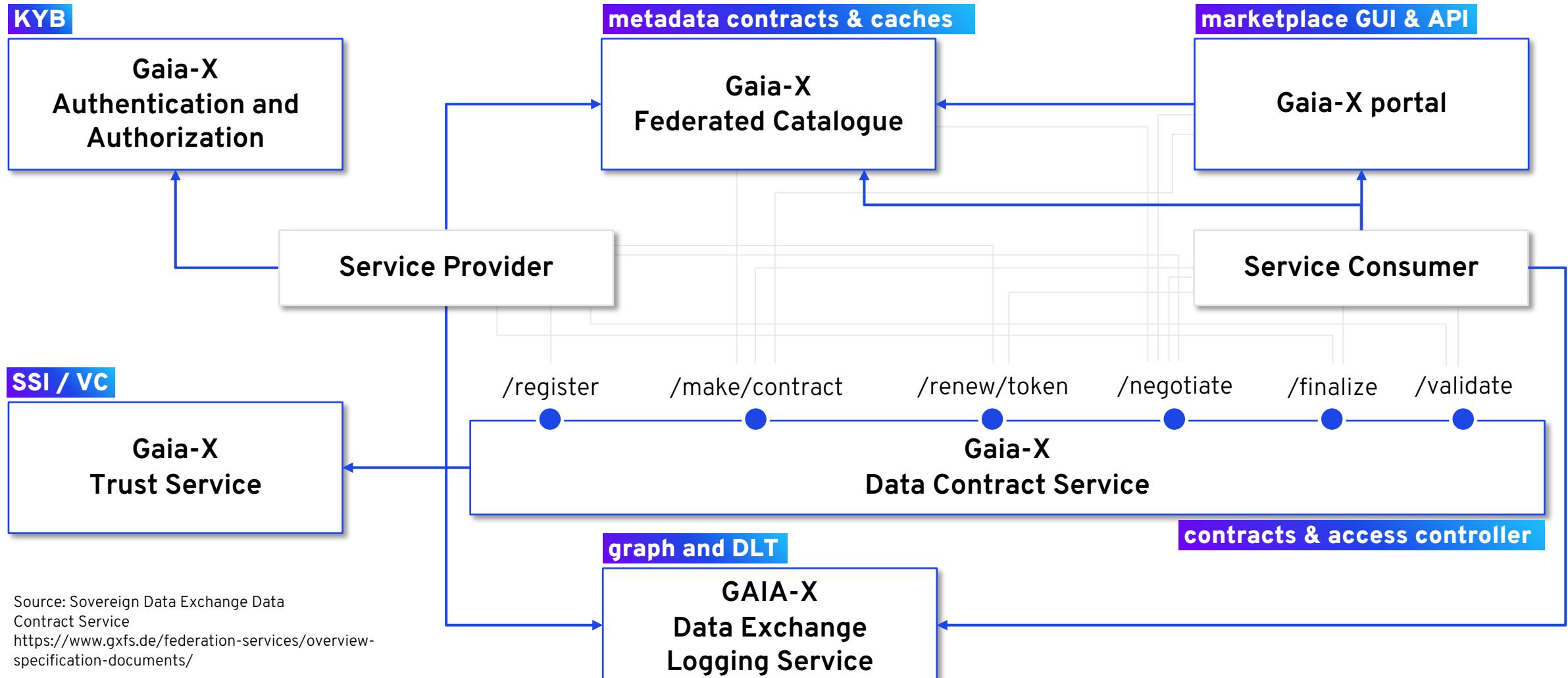
© Federal Ministry for Economic Affairs and Climate Action



exceptional & necessary



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



bootstrapping Gaia-X ecosystems

guiding principles



reuse existing software as much as possible

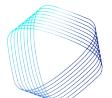
be transparent, use free open-source

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

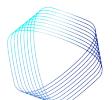
could we not build **one platform** then and be done with it?

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**.

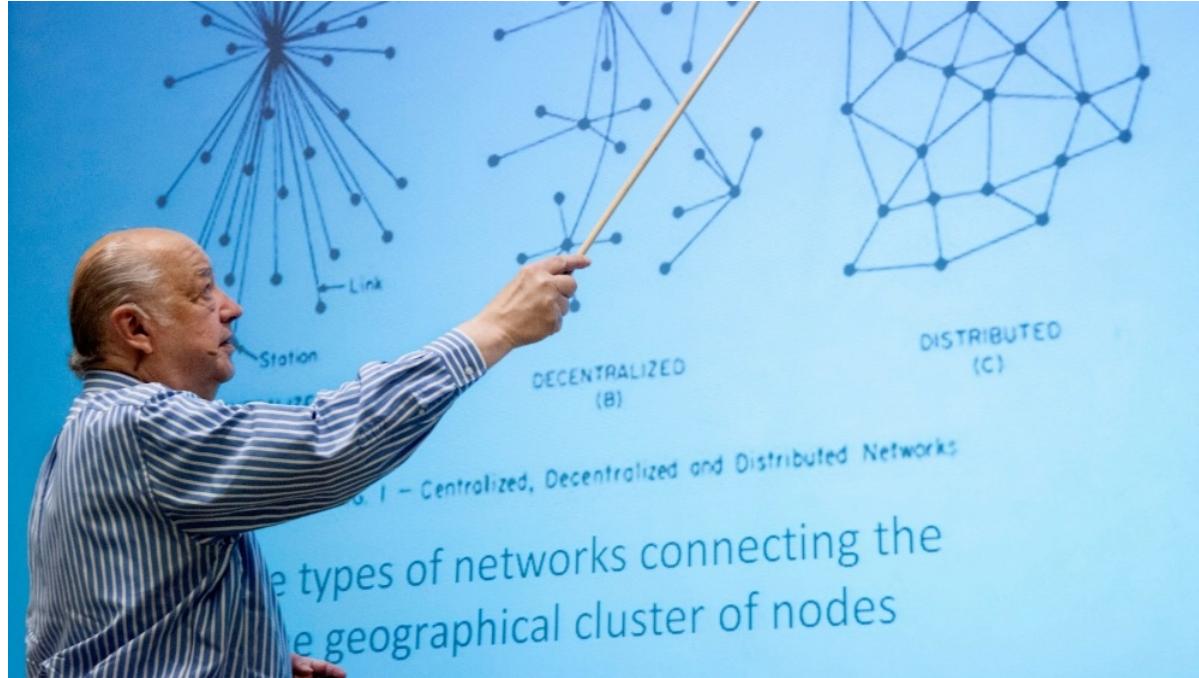
high switching costs generate a **lock-in effect** and can be exploited by platform owners.

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"

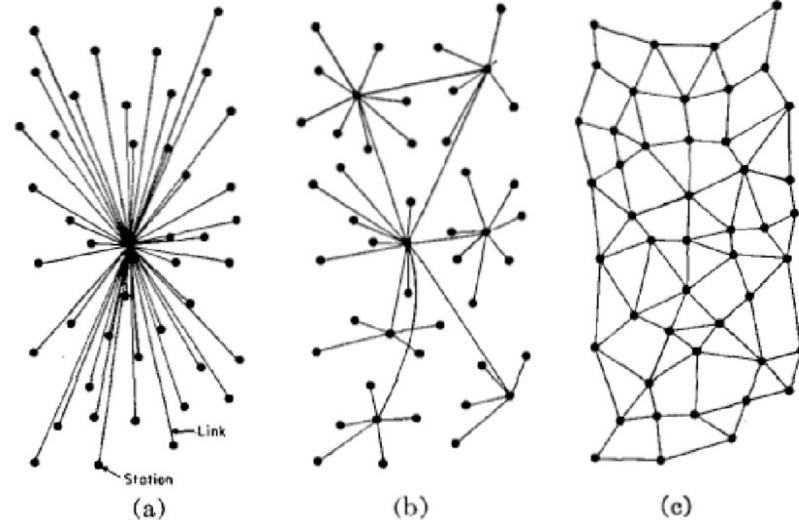
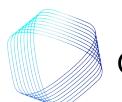
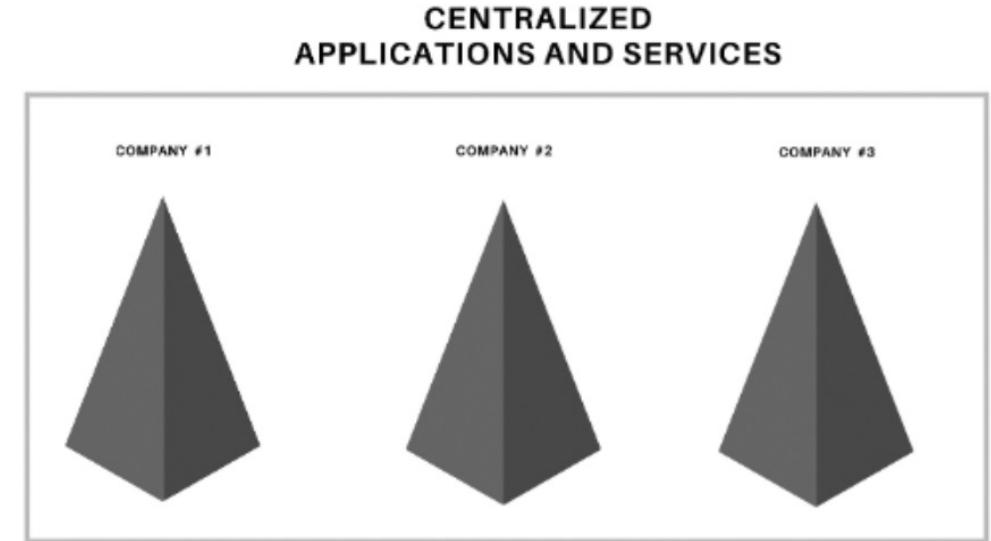
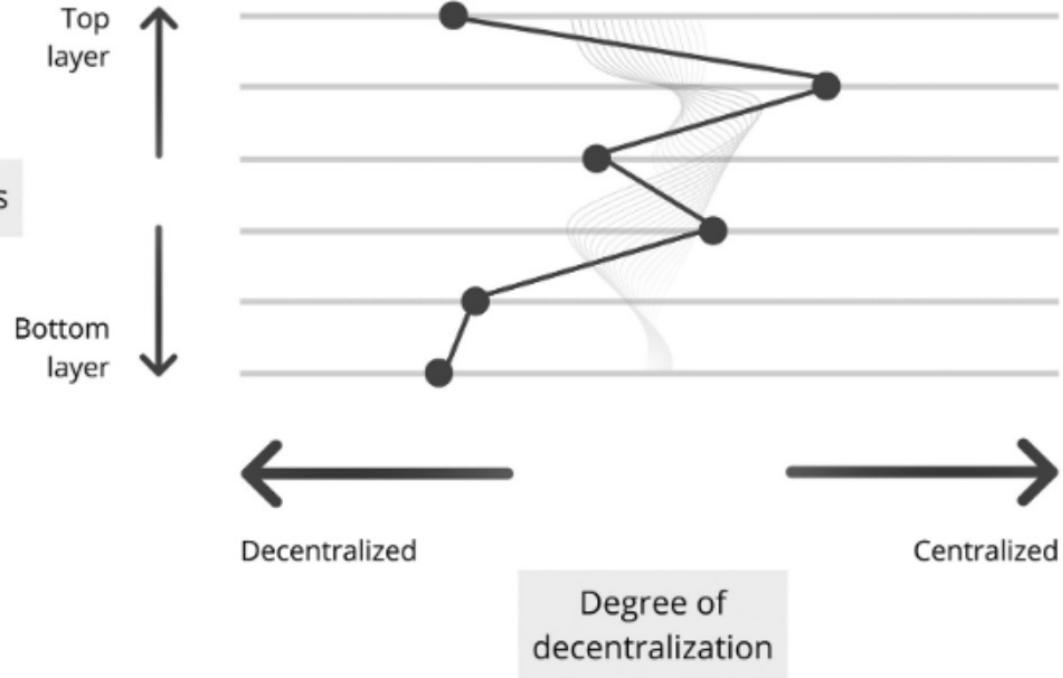


Fig. 1—(a) Centralized. (b) Decentralized. (c) Distributed networks.

centralization can be an expensive liability.



decentralization - a spectrum across layers



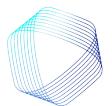
© Thibault Schrepel, Blockchain + Antitrust, <https://doi.org/10.4337/9781800885530>

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

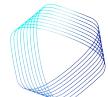
made with love and 100% free open-source technology



VMware Tanzu™



ocean

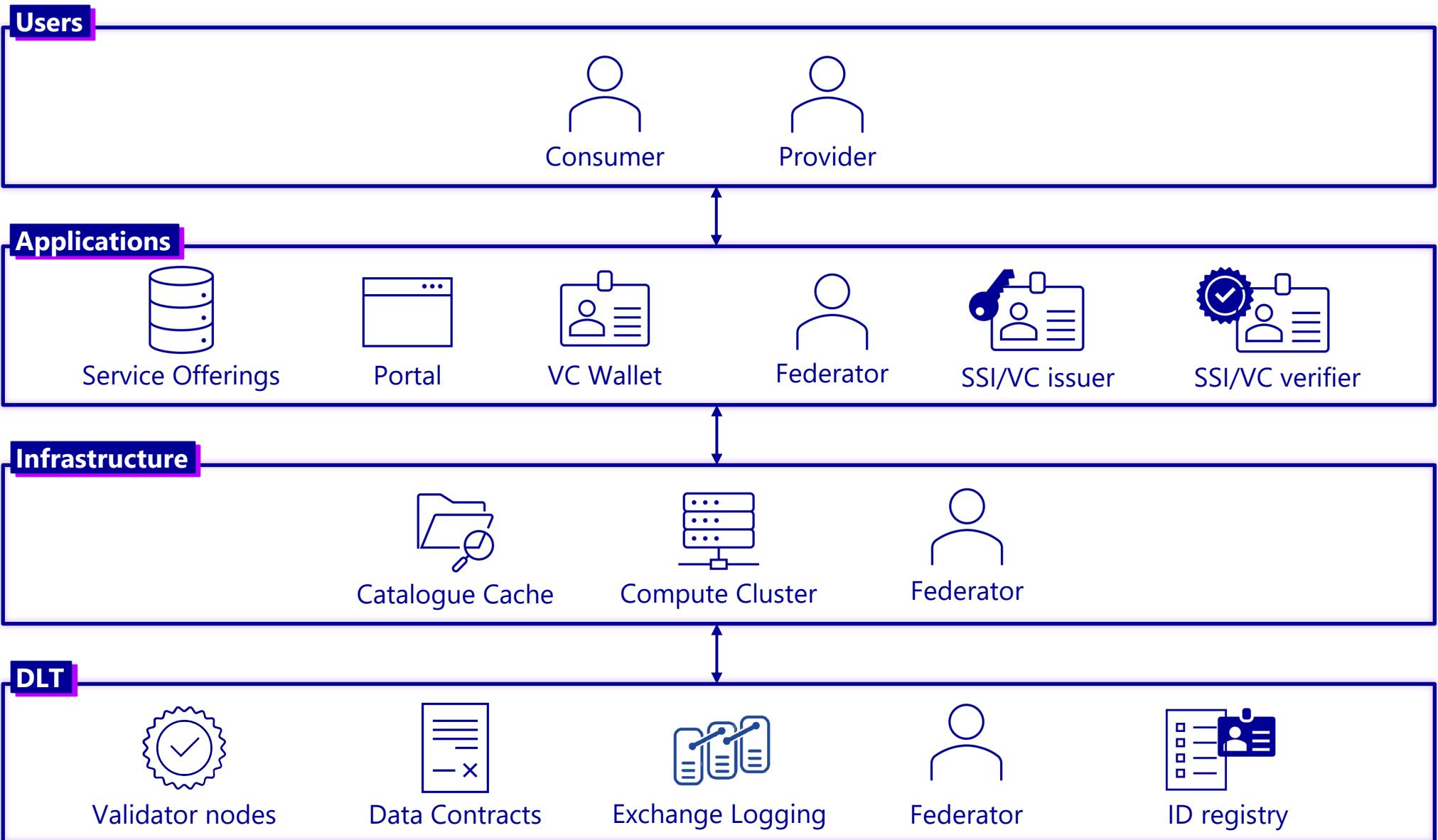


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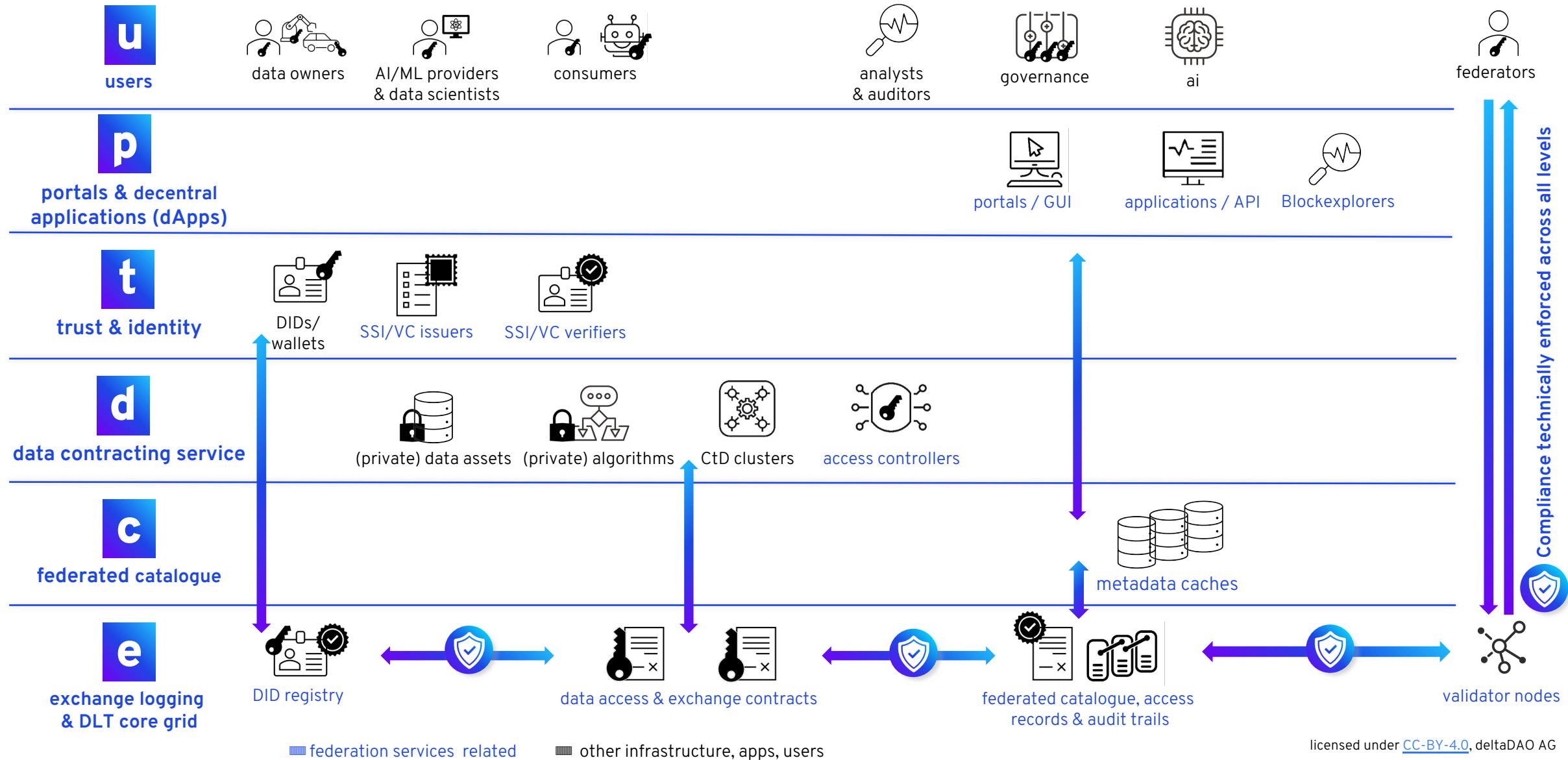
MVG ecosystem

bootstrapping Gaia-X ecosystems

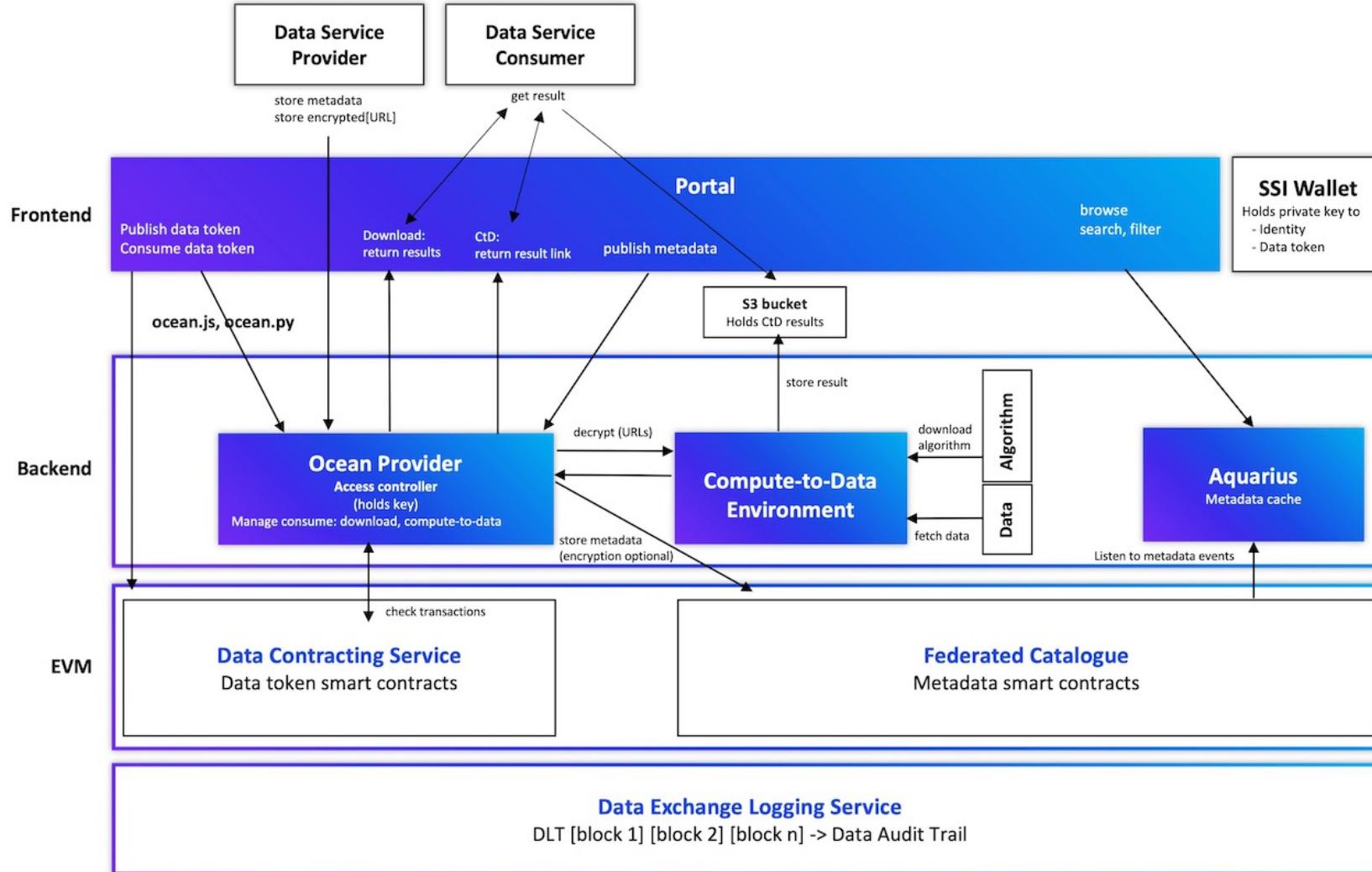


bootstrapping Gaia-X ecosystems

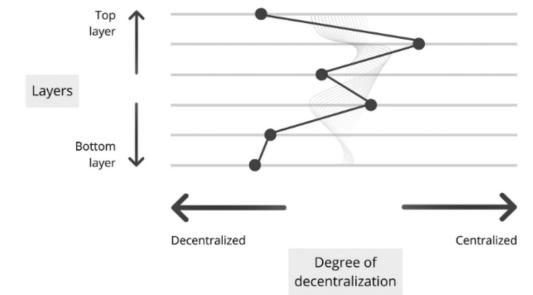
MVP Gaia-X Federation Services & Decentralized Core Grid



deep dive #1



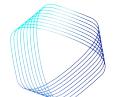
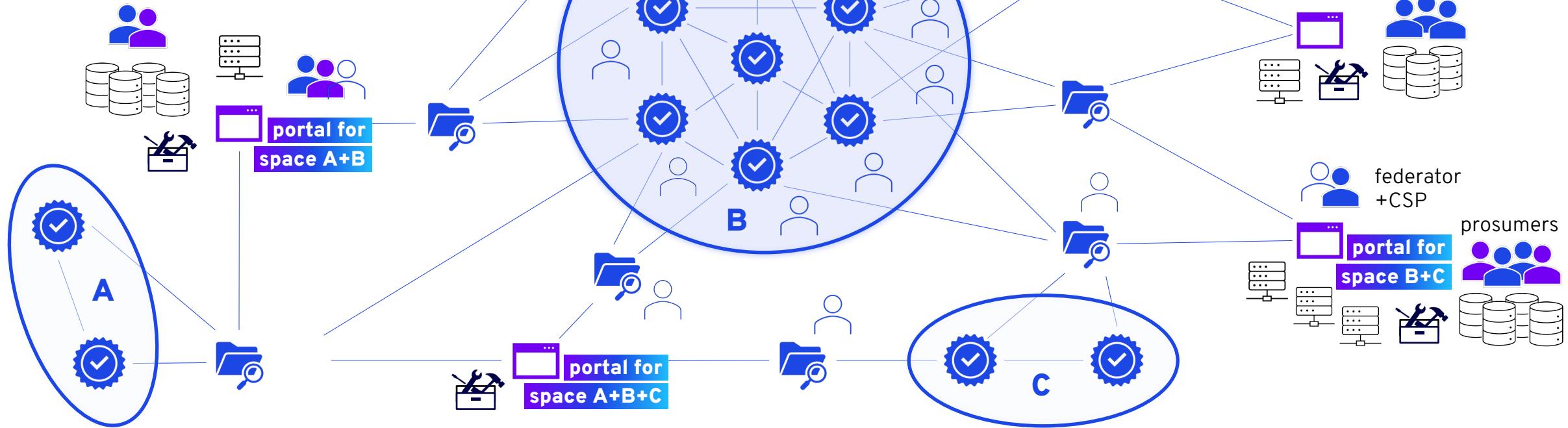
Decentralization & Distribution
across all layers



bootstrapping Gaia-X ecosystems

creation and connection of complex services from atomic and elementary services

	portal
	consumer
	federator
	validator
	federation services toolbox

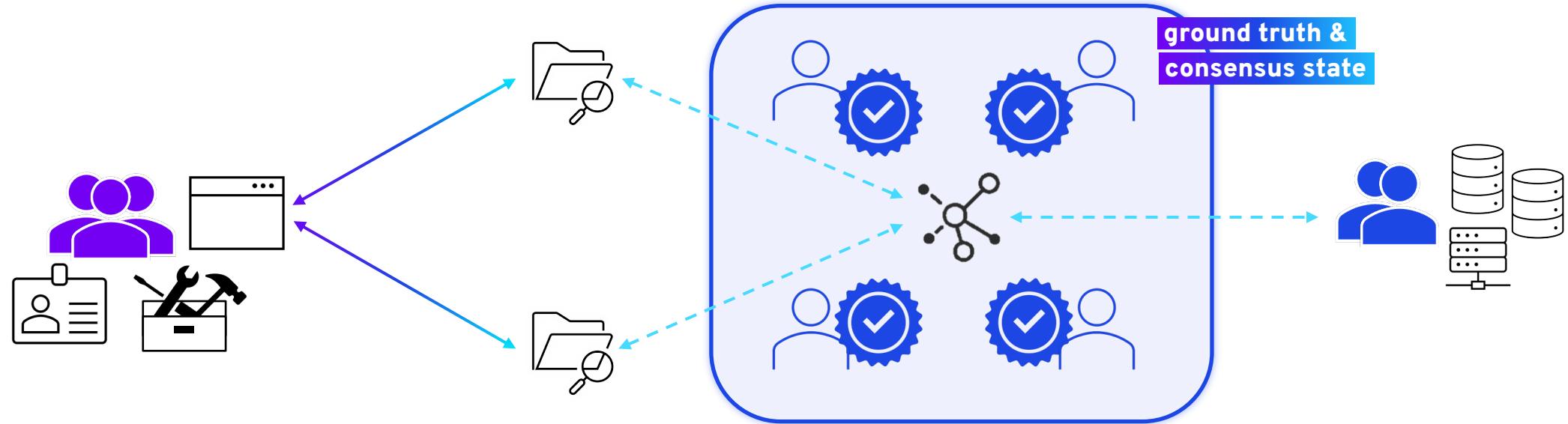


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remove all single points of failure from the federation



 federation services toolbox

 service catalogue

 federator

 service provider

 consumer

 catalogue cache

 service offering

 validator

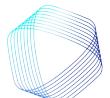
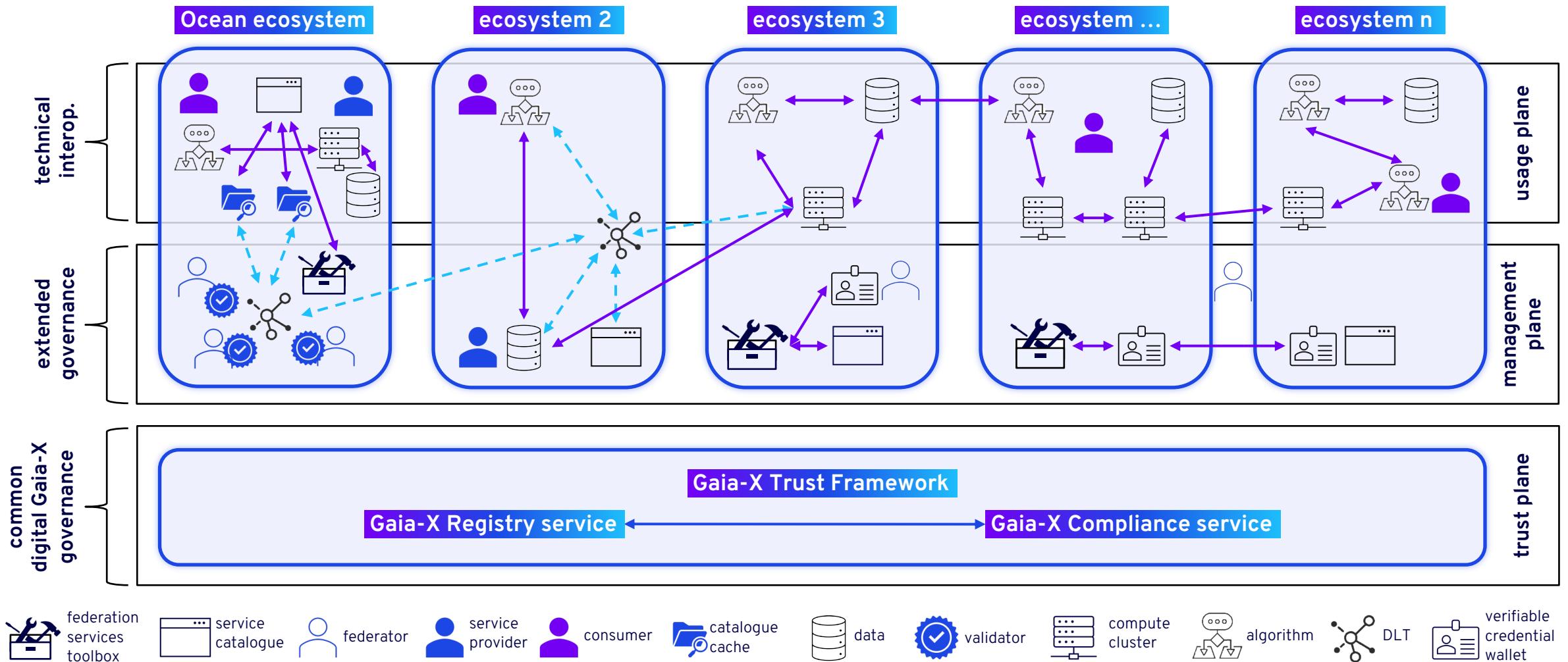
 compute cluster

 DLT

 verifiable credential wallet

bootstrapping Gaia-X ecosystems

federation of interoperable autonomous Gaia-X ecosystems



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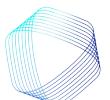
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Minimal Viable Gaia-X portal

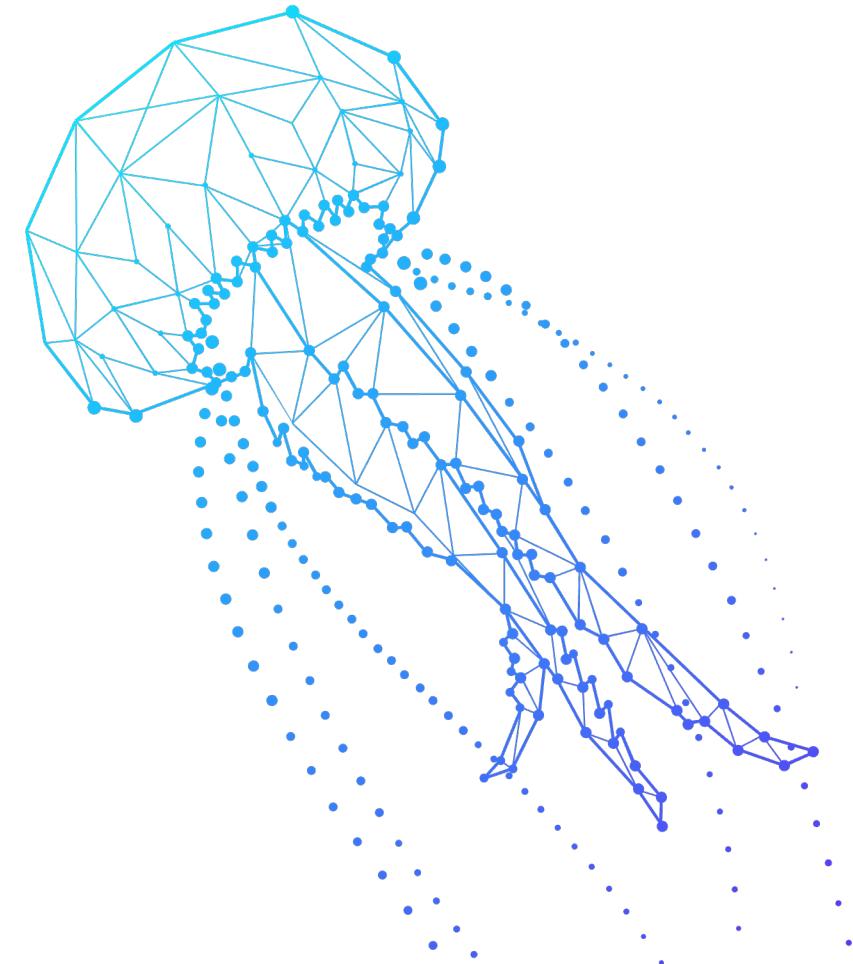


ocean

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. Below the navigation is the title "MVG Portal Demonstrator" and a subtitle "A platform to find, publish and consume Data Services in the Gaia-X Test Network." A "powered by" section shows the Ocean Protocol logo. On the left, a large blue banner features a purple play button icon with the text "START NOW". To the right, there's a section titled "Gaia-X on Ocean Protocol Academy" with a description of the platform's aims. The URL "https://portal.minimal-gaia-x.eu" is highlighted in a blue box at the top right, and a video link "Video: https://youtu.be/R49CXPTRamg" is also present.

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

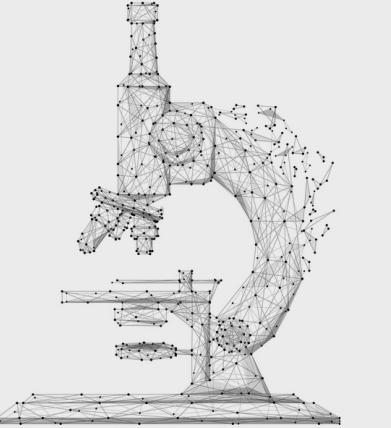
An open research and science platform following the FAIR guiding principles of findability, accessibility, interoperability and reusability.

powered by Ocean Protocol

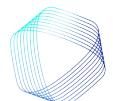
 ocean

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>



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Medium [UDL blogpost](#)

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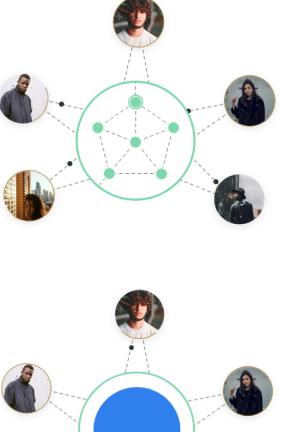
for SMEs and GDPR-compliant data usage

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

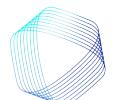
powered by Ocean Protocol



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.

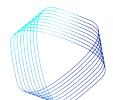
<https://safefbdc.portal.minimal-gaia-x.eu>

20
21

Background

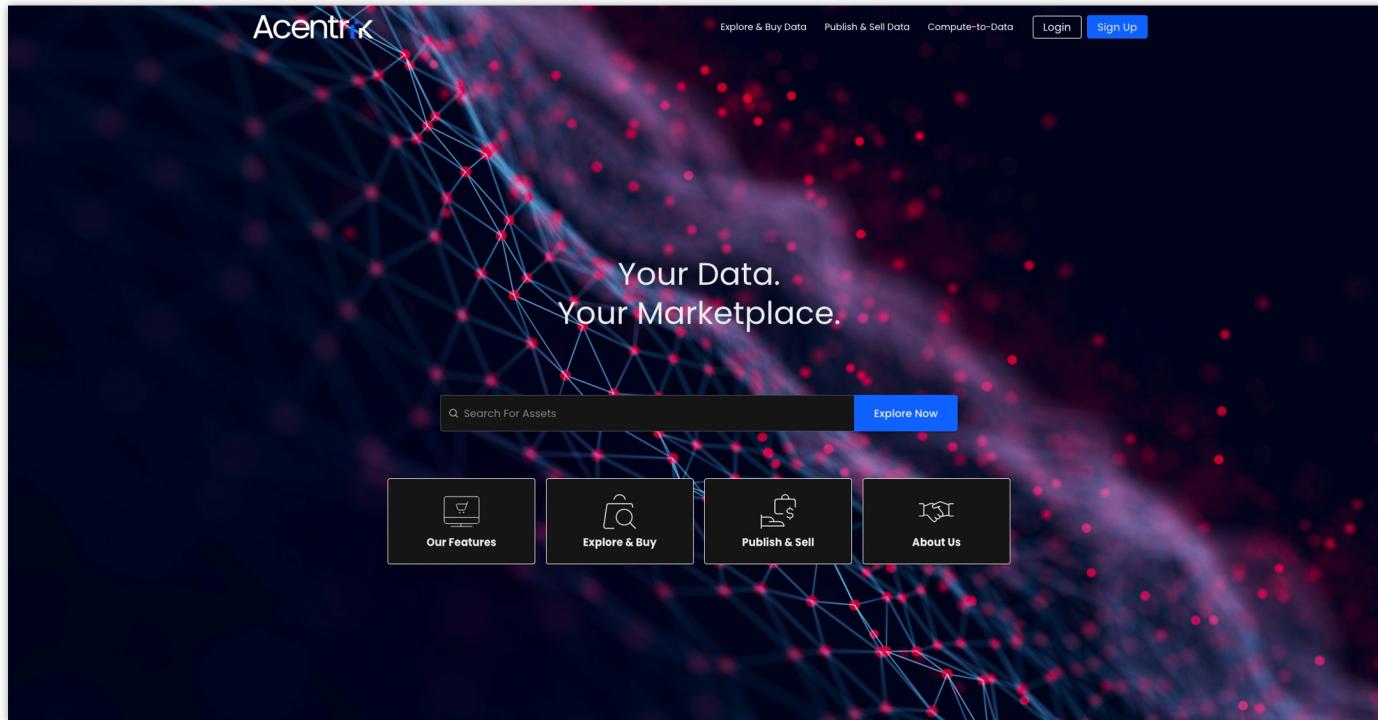
safeFBDC is a research project funded by the Federal Ministry for Economic Affairs and Energy (BMWi) with a three-year project duration (2021-2023). The consortium under the leadership of TechQuarter consists of eleven founding and 30+ associated partners covering a large part of the German financial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

20



bootstrapping Gaia-X ecosystems

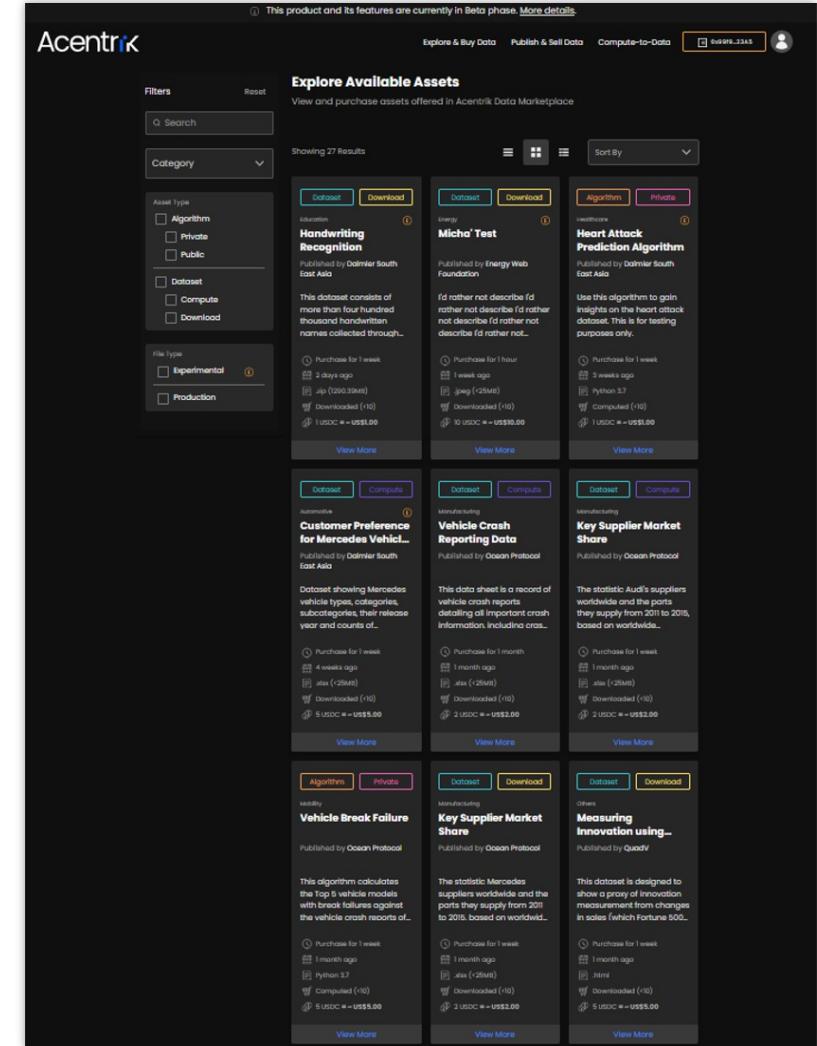
for enterprise marketplaces and cloud service providers



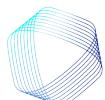
The screenshot shows the Acentrik homepage with a dark background featuring a network of red and blue dots. The title "Your Data. Your Marketplace." is centered. At the top right are "Login" and "Sign Up" buttons. Below the title are "Explore & Buy Data", "Publish & Sell Data", and "Compute-to-Data" 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](#)



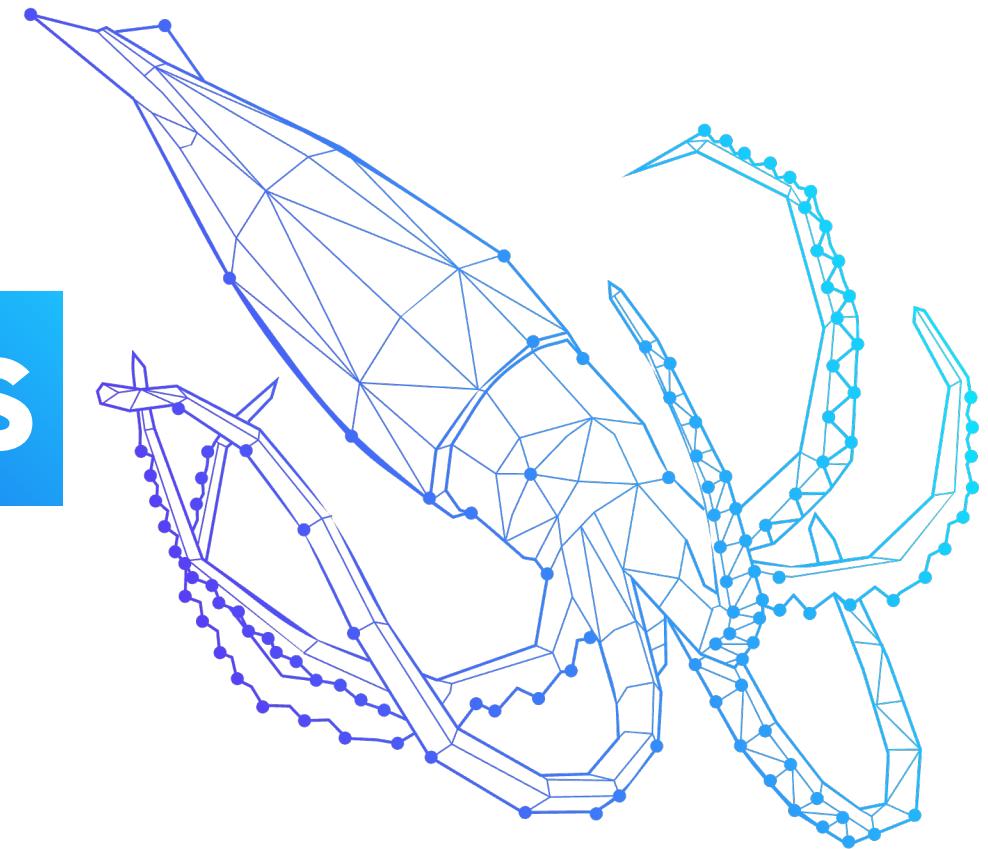
The screenshot shows the "Explore Available Assets" page in the Acentrik Data Marketplace. It displays a grid of asset cards. The first card is for "Handwriting Recognition" (Published by Daimler South East Asia). The second card is for "Micha's Test" (Published by Energy Web Foundation). The third card is for "Heart Attack Prediction Algorithm" (Published by Daimler South East Asia). The fourth card is for "Customer Preference for Mercedes Vehicles" (Published by Daimler South East Asia). The fifth card is for "Vehicle Crash Reporting Data" (Published by Ocean Protocol). The sixth card is for "Key Supplier Market Share" (Published by Ocean Protocol). The seventh card is for "Vehicle Break Failure" (Published by Ocean Protocol). The eighth card is for "Key Supplier Market Share" (Published by Ocean Protocol). The ninth card is for "Measuring Innovation using..." (Published by Quadv). Each card includes a brief description, publication details, and purchase/download options.



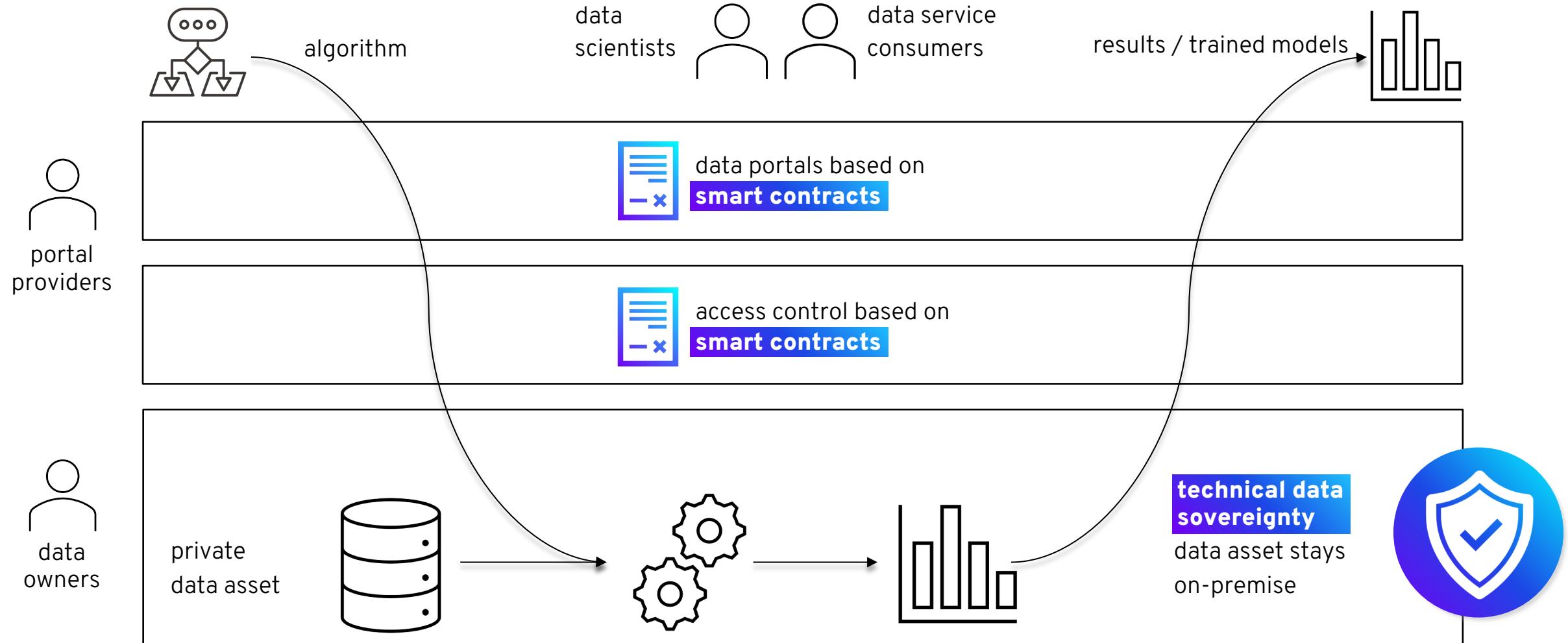
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Minimal Viable Gaia-X Features



compute-to-data enables true technical data sovereignty



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 [0x68C2...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) ↗
LoQDFR-49 | 0x68C2...246B | 01d10f4081a0Cc782896339144724bcC51981BE4400 5

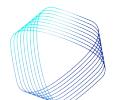
You will pay 5 OCEAN ⓘ

BUY COMPUTE JOB

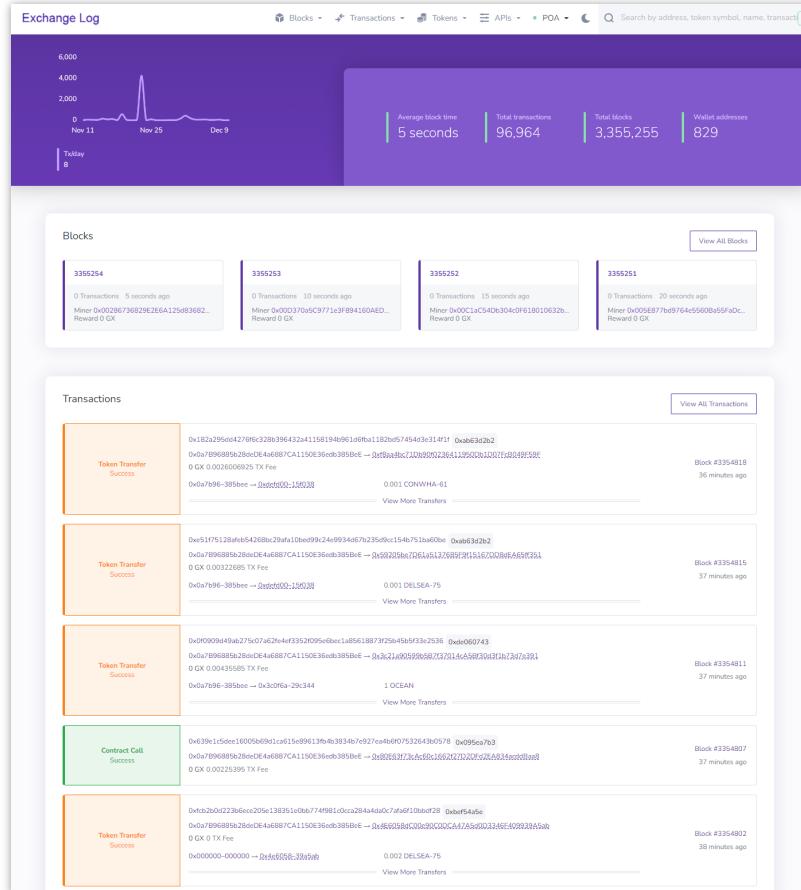
You do not have enough OCEAN in your wallet to purchase this asset.

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

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



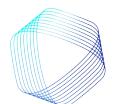
automatic audit trails & security & privacy by design



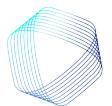
Transaction Details

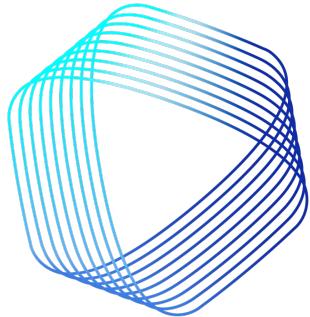
Transaction Hash	0x182a295dd4276f6c328b396432a41158194b961d6fba1182bd57454d3e314f1f
Result	Success
Status	Confirmed
Block	3354818
Timestamp	3 hours ago December-12-2021 06:25:50 PM +1 UTC Confirmed within <= 5.0 seconds
From	0xa7b96885b28dede4a6887ca1150e36edb385bee
Interacted With (To)	0xf8aa4bc71db90f0236411950db1d07fc049f59f
Tokens Transferred	<p>From 0xa7b96885b28deDE4a6887CA1150E36edb385BeE</p> <p>To 0x3c0F6a52c84A79eBC52C56F8C029a30F929C344</p> <p>For 0.998 CONWHA-61</p> <p>From 0xa7b96885b28deDE4a6887CA1150E36edb385BeE</p> <p>To 0x9984b2453eC7D99a73A5B3a46Da81f197B753C8d</p> <p>For 0.001 CONWHA-61</p> <p>From 0xa7b96885b28deDE4a6887CA1150E36edb385BeE</p> <p>To 0xDefD0018969cd2d4E648209F876ADe184815f038</p> <p>For 0.001 CONWHA-61</p>
Value	0 GX
Transaction Fee	0.0022258425 GX
Gas Price	52.5 Gwei

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



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deltaDAO

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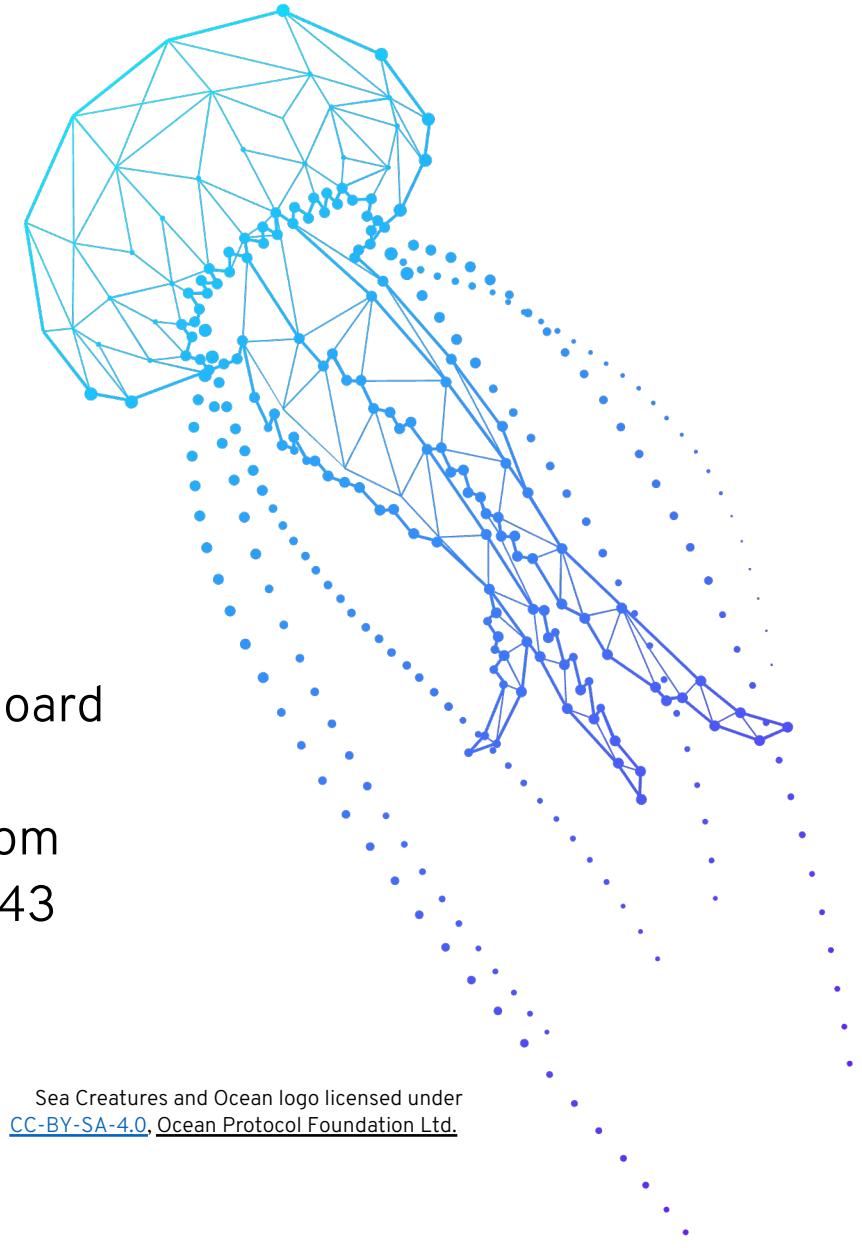
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