

Building Open Data Ecosystems with Ocean Protocol

@oceanprotocol
Trent McConaghy

ODYSSEY
2020

Data



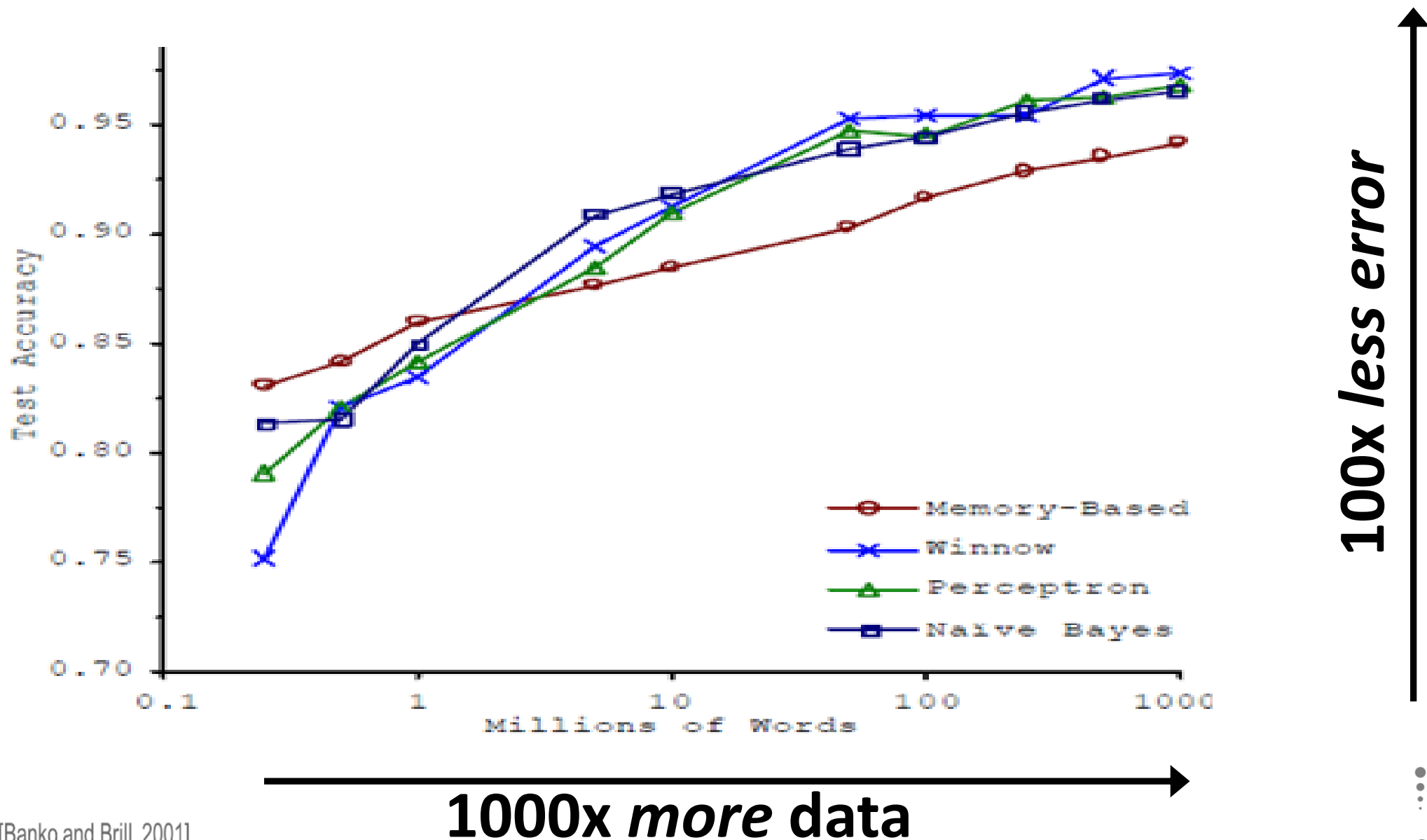
The
Economist

The world's most valuable resource



Data and the new rules
of competition

How? *AI loves data*. Has led to data moats :(



[Banko and Brill, 2001]



About Ocean

Ocean in a Nutshell

- **Safely & securely exchange data, without loss of privacy**
- **A public utility network to connect AI / data suppliers & consumers**
 - **Decentralized access control**
 - **Decentralized orchestration**
- **Data marketplaces in-a-box**
- **Buy & sell *private* data, while protecting privacy**
- **Rethink data custody: “not your keys, not your data”**

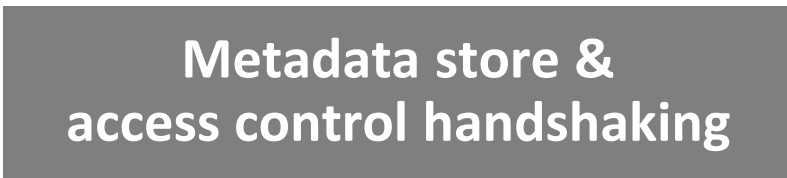
Architecture is similar to flight tickets, BitTorrent, DNS, Ox, ..



Many-local
frontend

Kayak.com,
easyjet.com

Kazaa



Metadata

Backends for
Kayak / Easyjet

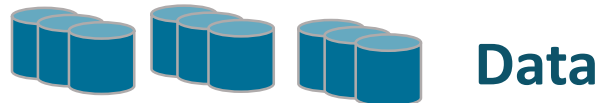
Torrent
trackers



Single-global,
handshaking

SABRE
database

BitTorrent
network



Actual Product

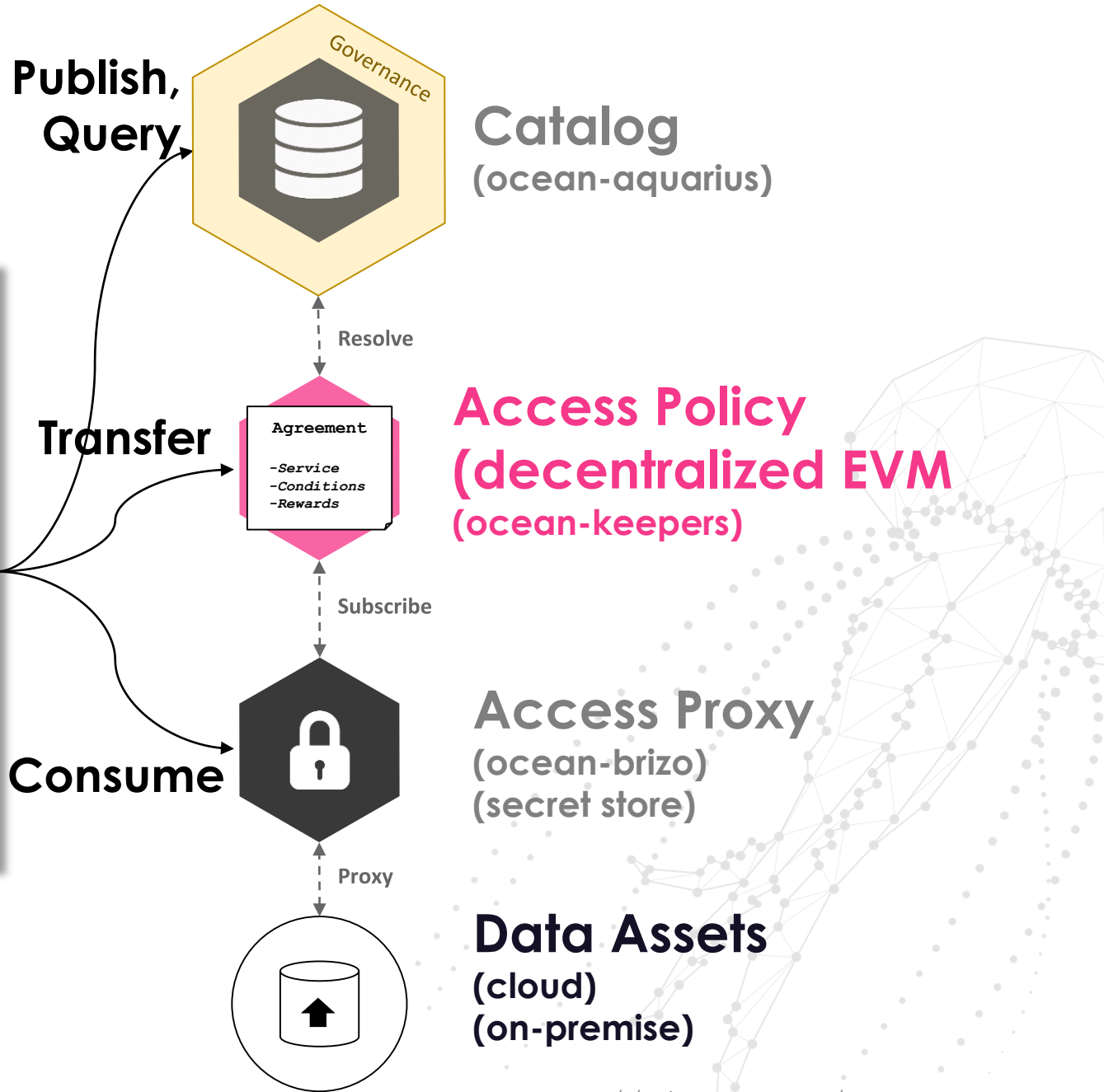
Flight ticket

Movie file

Ocean Tech

Data Marketplaces,
Dapps, Wallets

Rank	Dataset ID	Dataset Name	Publisher Name	Date Published	Token	Price Change	Price	Total
1	78XcYT9	Laser Target Practice Exercises	Lazerdrone Ltd.	03-08-2019	LAZ	+4.5%	1LAZ = 9.20	2.99k total LAZ
2	87ertHG	Facial Recognition Data	VoyeurDrone Inc.	20-06-2016	VOY	-2.6%	1LAZ = 1.02	3.08k total VOY
3	000x567	Thermal Sensor Data	Predator Movement	31-09-2022	KTH	+0.6%	1LAZ = 4.02	1.56k total KTH
4	96zERC	Human Locations based on IP	SkyNet	09-11-2020	KLO	+3.1%	1LAZ = 0.54	8.22k total KLO
5	254phyY	Human Biological Weaknesses	The Overmind	28-06-2016	REX	-1.5%	1LAZ = 2.96	0.44k total REX
6	Add your dataset here ... and become part of the community							



Ocean Data Marketplaces

Benefits



- **Preserve privacy**: compute to data



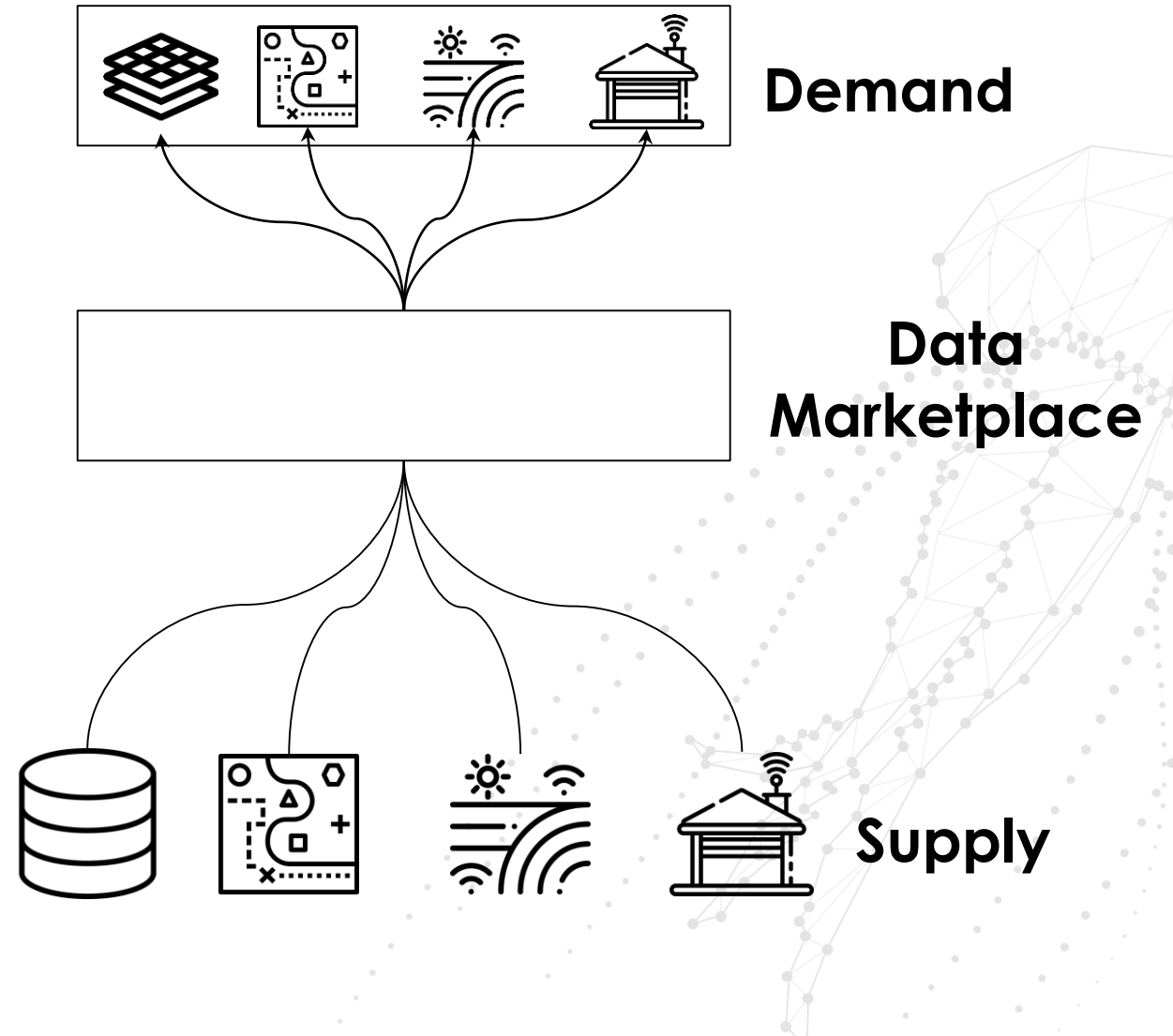
- **Secure data management**: tokenized access control



- **Out-of-box marketplace**, with pricing



ocean



Odyssey Hackathon Mission



TO BRIDGE THE GAP
BETWEEN
CHALLENGE-
OWNERS AND
CHALLENGE-
SOLVERS



BREAK DOWN THE
INDUSTRY SILOS BY
CONNECTING ALL
STAKEHOLDERS
AND OPENING NEW
MARKETS FOR
SOLUTIONS



SCALE INNOVATION
BY INCUBATING
ECOSYSTEMS THAT
SOLVE COMPLEX
CHALLENGES
THROUGH MASS
COLLABORATION

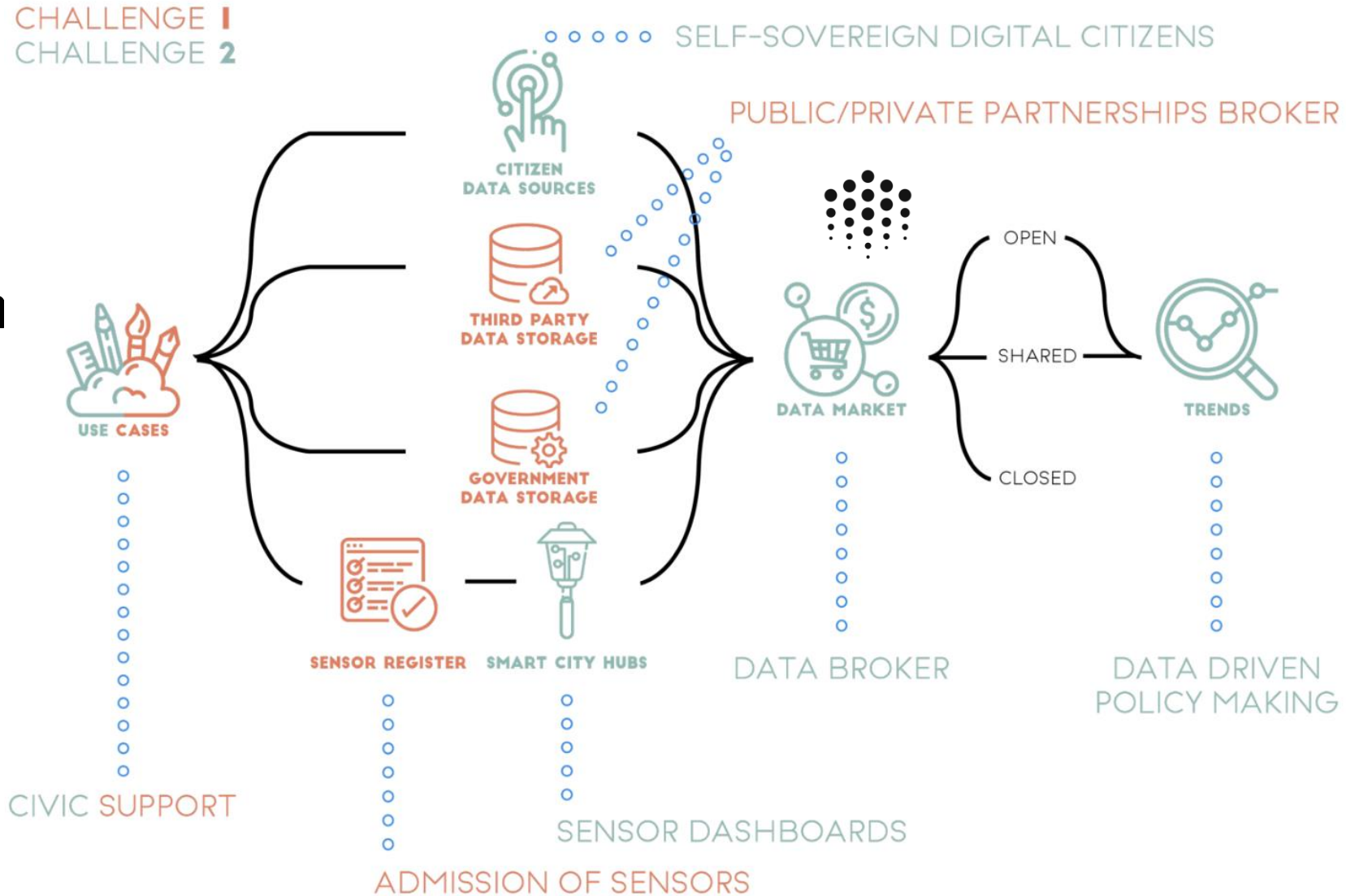


CO-CREATE A
DIGITAL PUBLIC
INFRASTRUCTURE
FOR EVERYONE, TO
SUPPORT SUCH
COLLABORATION

Role of Ocean at Odyssey

(Example: Conscious Cities Track)

- Data Market module
- API to publish, query, consume, transfer data
- Tech support





On Preserving Privacy



Data
you
have

1 hospital



Data you want

***10,000
hospitals***



**The most valuable data
is private data.**



Data
you
have

1 hospital

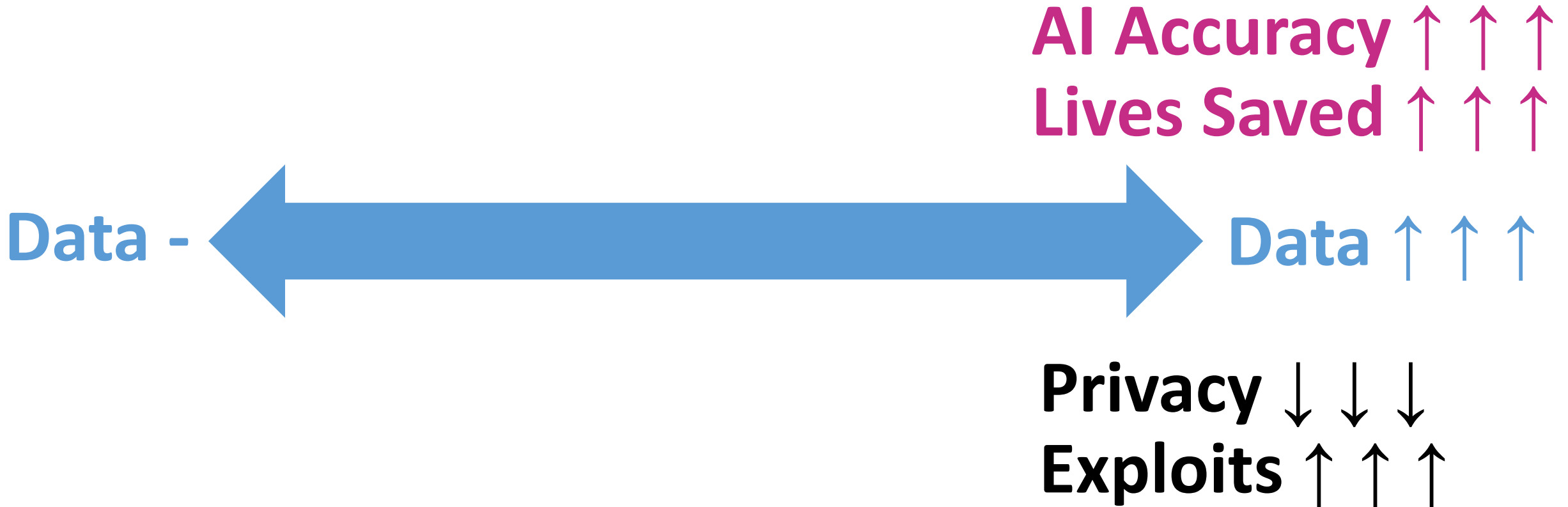
**Showstopper:
Privacy & Control**

Data you want

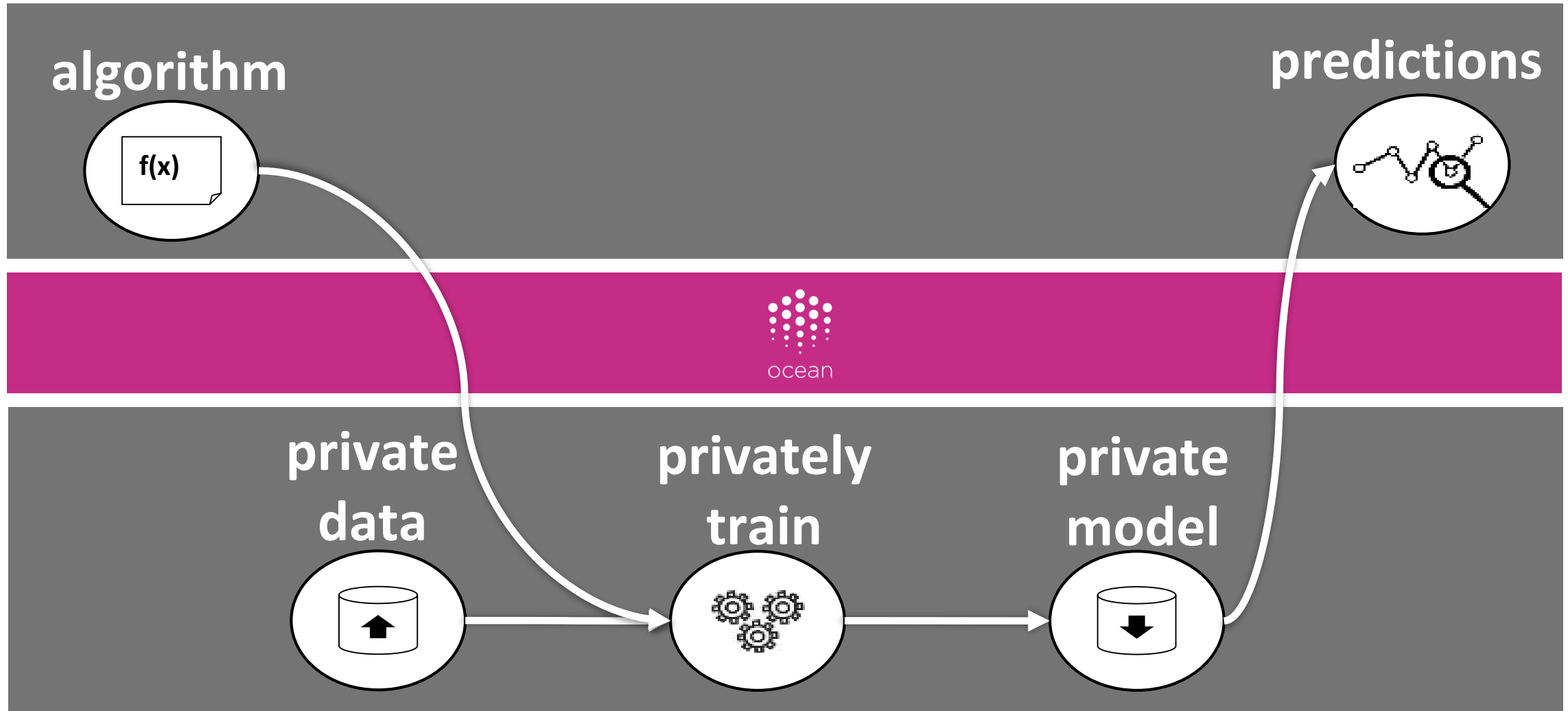
***10,000
hospitals***



A Fundamental Tradeoff?



Bring compute to data, with Ocean



Ocean Resolves the Tradeoff by Bringing Compute to the Data



Privacy

Retain privacy &
control:)





ocean

**Data you'll
get!**

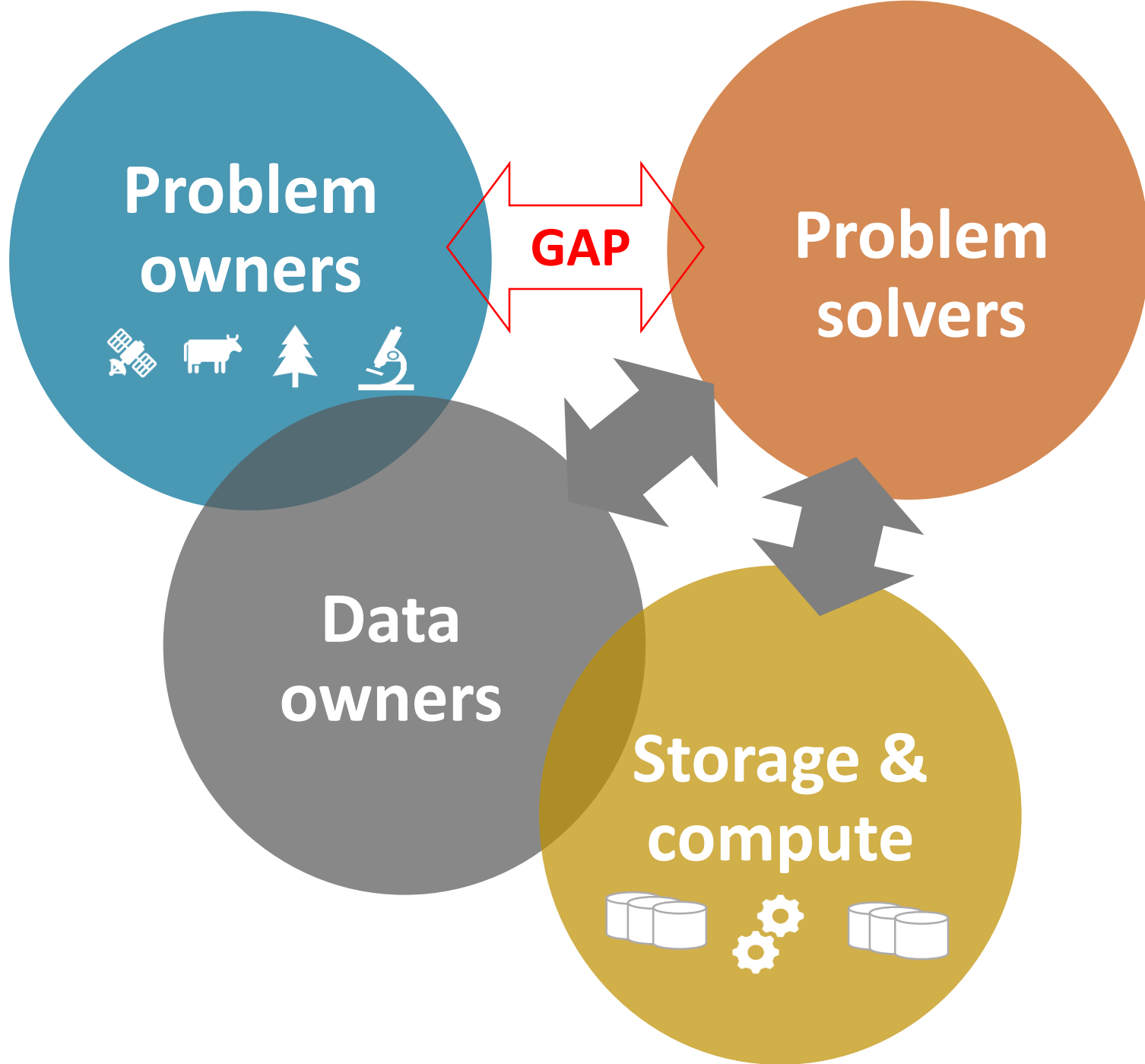
***10,000
hospitals***

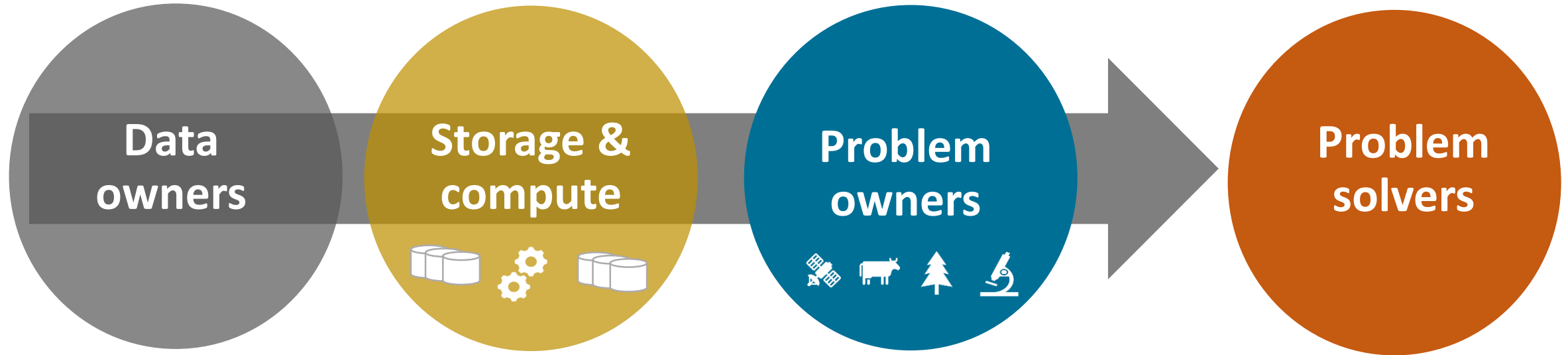
**Data
you
have**

1 hospital



**Odyssey Tracks:
Data Marketplaces in Smart Cities,
Energy, ...**





Marketplaces & commons for data, storage, and compute

Problem & prize platforms

Data science tools



Connective tissue:
Ocean public utility network

Have data	Have AI (Want data)	Have data	Have data	Have AI (Want data)
Have AI (Want data)	Have data	Have AI (Want data)	Have AI (Want data)	Have data
Data marketplace	DM	DM	DM	DM
DM	DM	DM	DM	DM
DM	DM	DM	DM	DM
DM	DM	DM	DM	DM



**Connective tissue:
Ocean public utility network**



Example: commons.oceanprotocol.com



[Channels](#) [Publish](#) [History](#) [Faucet](#) [About](#) ●

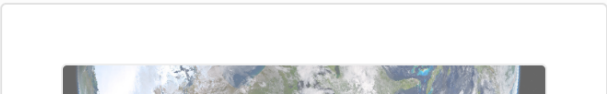
Commons

A marketplace to find and publish open data sets in the Ocean Network.

 SEARCH

Featured Channel

AI For Good




Benefits of Ocean-based marketplaces

“Your keys, your data”

- Seller retains control of the data. No data escapes.
- Buy & sell private (!) data. The most valuable data
- Don't need to trust marketplace owner; they don't hold data
- Marketplace owner isn't liable for the data
- Liquidity across data silos in enterprises & governments
- Out-of-the-box “whitelabel” marketplace





**Odyssey Tracks:
Data Management
in Smart Cities, Energy, ..**

Traditional Data Management: Breaches the Norm

In 2017, Equifax was [hacked](#). Credit card information of 148 million people was compromised, including customer names, Social Security numbers, birthdates and addresses. Equifax had to pay a [\\$700M fine](#) for the data breach.



Bitcoin (and Blockchains) are crazy-secure.

“Your keys, your Bitcoin. Not your keys, not your Bitcoin”

Bitcoin is worth \$132B.

It's fully open.

Hack it well and you could make > \$1B.

But it hasn't had security issues for years.

Why? Fundamentally different security:

- No central point of control
- 1000's of independent nodes that store the most important info: who owns what



Ocean: Blockchain Security for Data Management

“Your keys, your data. Not your keys, not your data.”

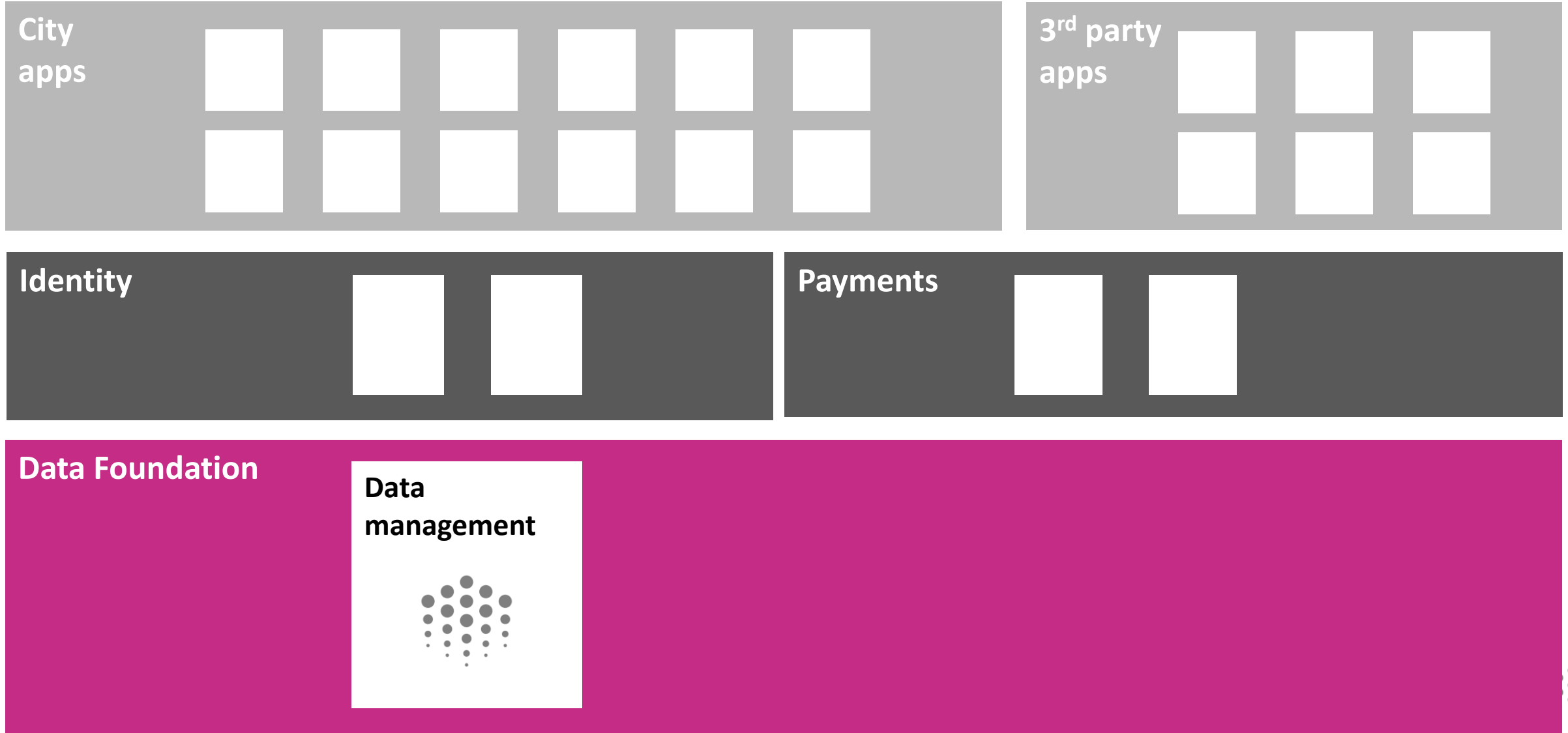
- Data custody \approx blockchain token custody (HW wallets, etc.)
- Transfer data \approx transferring OP data access
- Data security \approx blockchain security (>bank-grade by default)



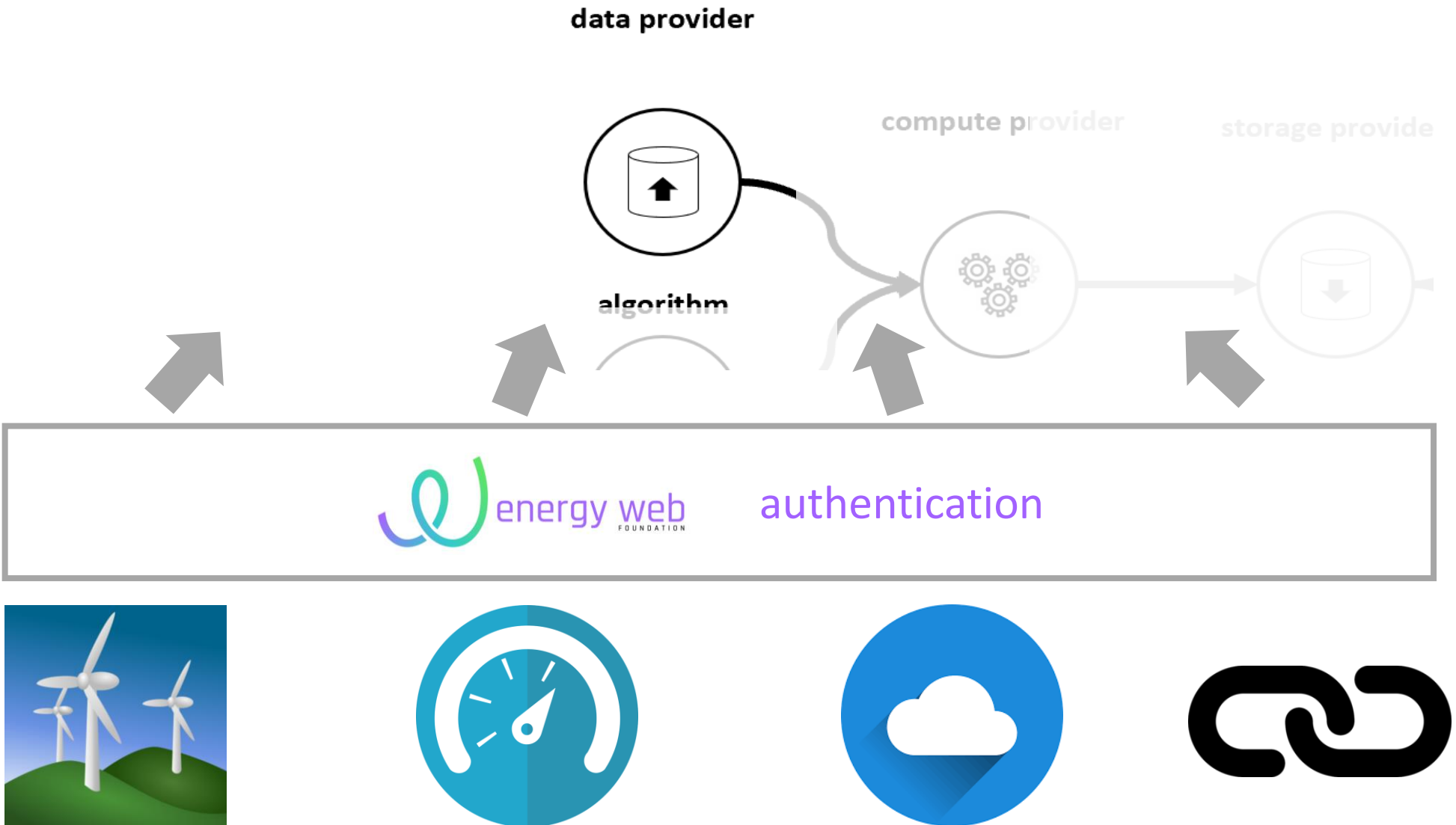
(Image © Riddle & Code)

Blockchain-based data management for cities

Layer in identity + payments. On top, dozens of applications.

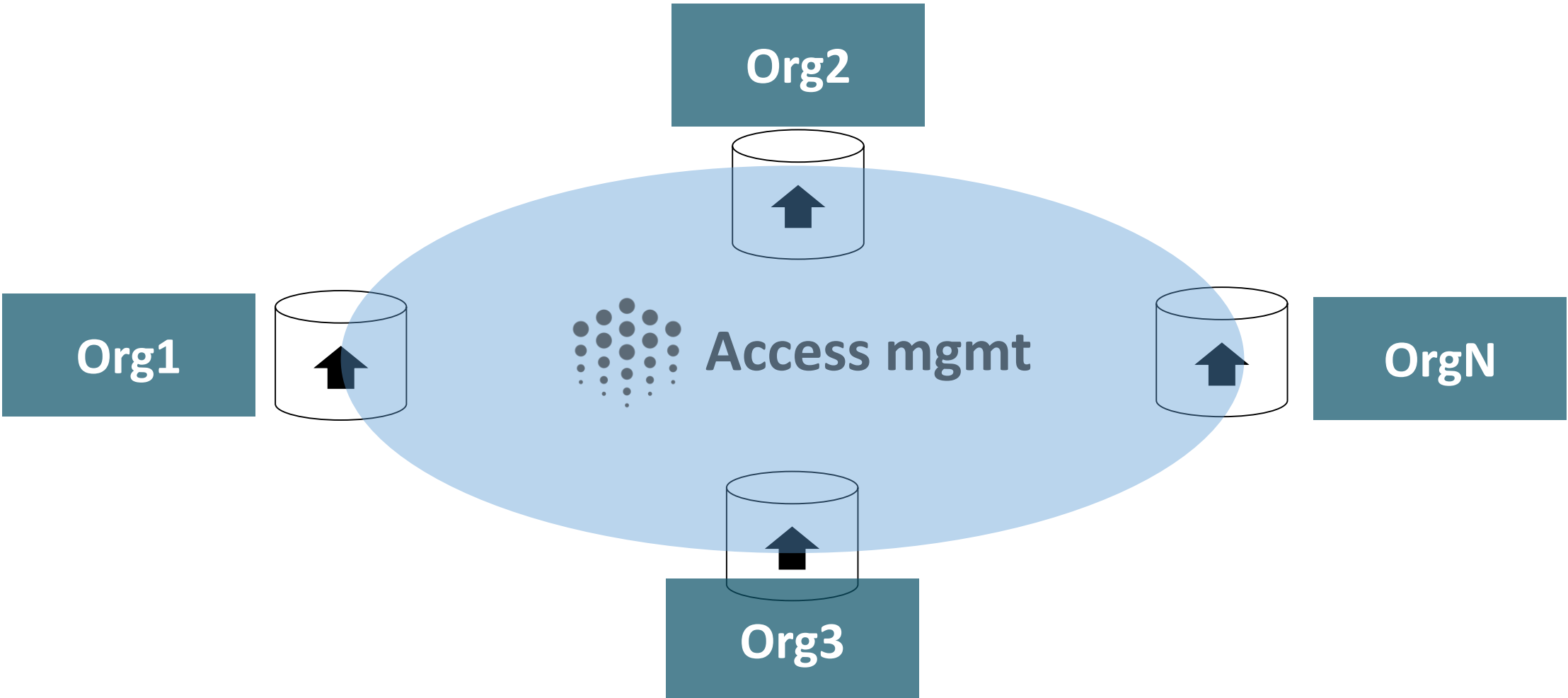


Example: EWF-authenticated data (from internal, Web2, Web3)



Example: Energy data access management among your org's offices, or between your org & collaborators.

“Google Drive, without the Google”



Benefits of blockchain-based data management

- **Get benefits of digital-native**
 - 5-10x less \$ spent on admin (ref .Estonia)
 - More comprehensive, faster, simpler gov't services for citizens
 - More opportunities for citizens
- **Get special benefits from Ocean / blockchain**
 - Preserve privacy
 - Secure data management
 - Out-of-box marketplaces for city data
 - Provenance of transactions in id, payments, data
 - Unlock more AI applications in health, more





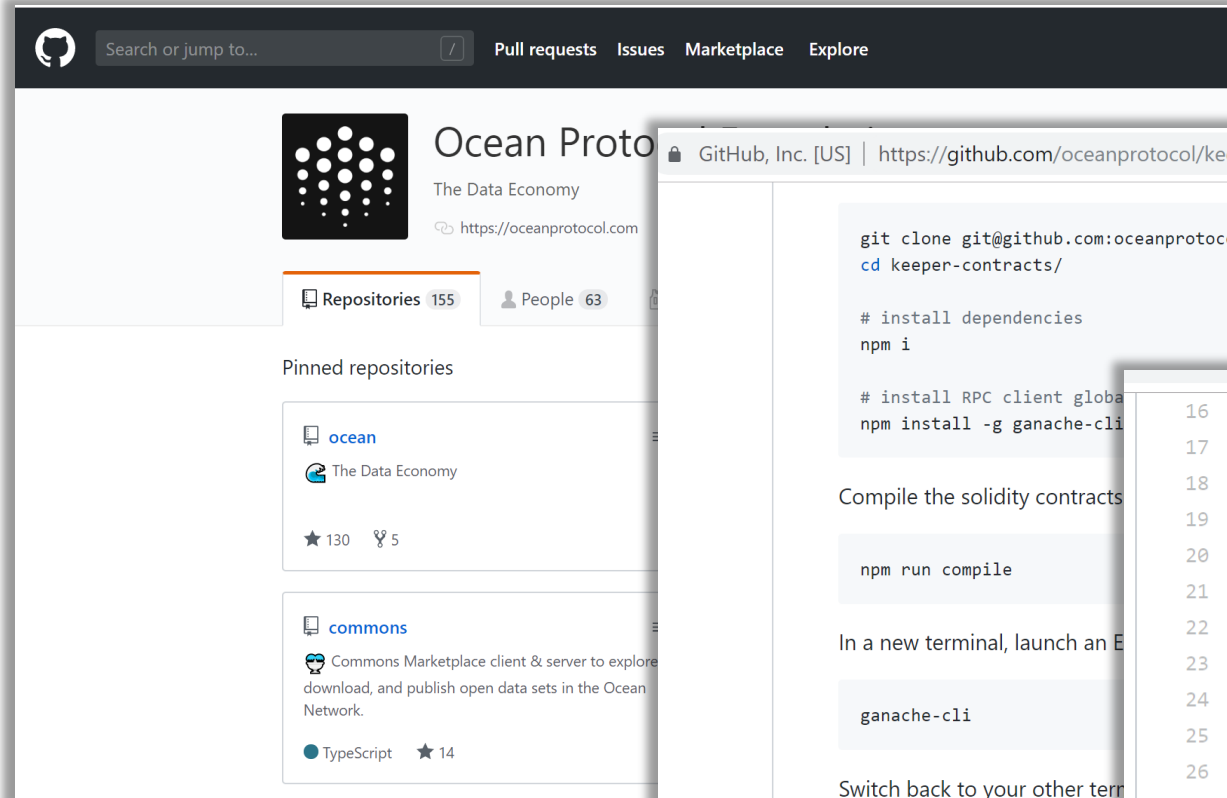
How To Build on Ocean

On Ocean Tech

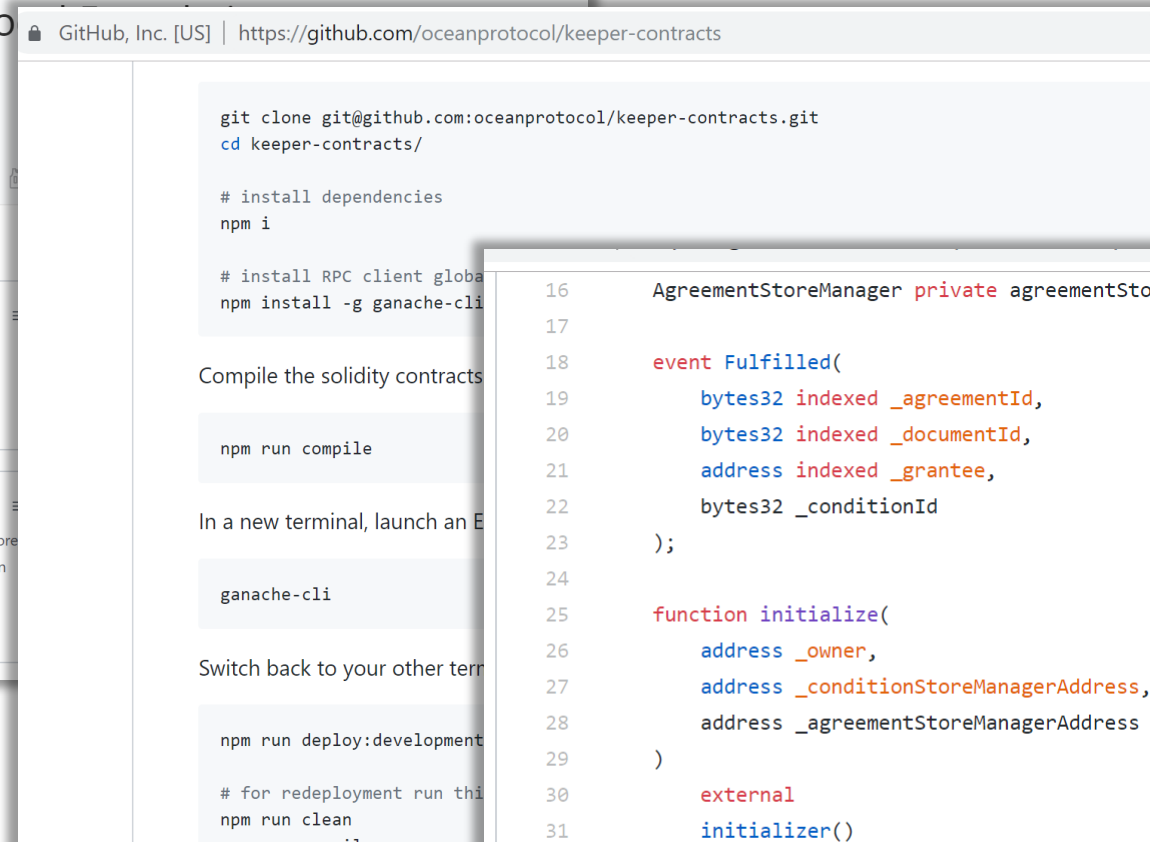
- Public EVM network, running Parity POA
 - But with access control on data itself
- TokenBridge to Ethereum mainnet
- **“Squid” = SDKs in Python, JS, Java. REST API.**

All Ocean Code is Open

github.com/oceanprotocol



The screenshot shows the GitHub profile page for Ocean Protocol. The profile name is "Ocean Protocol" with the tagline "The Data Economy" and the website "https://oceanprotocol.com". It features 155 repositories and 63 people. Pinned repositories include "ocean" (The Data Economy, 130 stars, 5 forks) and "commons" (Commons Marketplace client & server to explore, download, and publish open data sets in the Ocean Network, TypeScript, 14 stars).



The screenshot shows the GitHub repository page for "keeper-contracts" by Ocean Protocol. The page includes instructions for cloning the repository and installing dependencies:

```
git clone git@github.com:oceanprotocol/keeper-contracts.git
cd keeper-contracts/

# install dependencies
npm i

# install RPC client globally
npm install -g ganache-cli
```

Below the code, there are instructions to compile the Solidity contracts:

```
npm run compile
```

Next, instructions to launch a local environment:

```
ganache-cli
```

Finally, instructions to switch back to the terminal and deploy the contracts:

```
npm run deploy:development

# for redeployment run this
npm run clean
npm run compile
```

```
16 AgreementStoreManager private agreementStoreManager;
17
18 event Fulfilled(
19     bytes32 indexed _agreementId,
20     bytes32 indexed _documentId,
21     address indexed _grantee,
22     bytes32 _conditionId
23 );
24
25 function initialize(
26     address _owner,
27     address _conditionStoreManagerAddress,
28     address _agreementStoreManagerAddress
29 )
30 external
31 initializer()
32 {
33     Ownable.initialize(_owner);
34
35     conditionStoreManager = ConditionStoreManager(
36         conditionStoreManagerAddress
```



Documentation:

docs.oceanprotocol.com



Ocean Protocol Documentation

Learn about the components of the Ocean Protocol software stack, and how to run or use the components relevant to you.

Core Concepts

Understand the fundamentals of Ocean Protocol.

[Learn More](#) →

Setup Guides

Setting up the Ocean Protocol components.

[Learn More](#) →

Tutorials

Browse tutorials for most common setup and development use-cases.

[Learn More](#) →



Example: Quickly build a React App

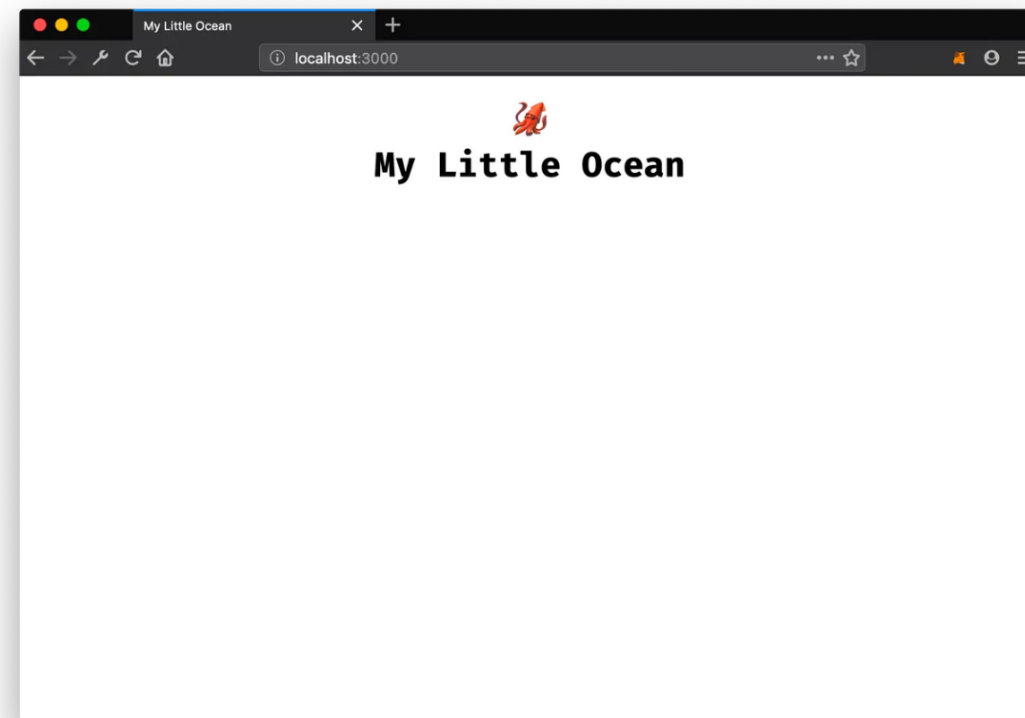
docs.oceanprotocol.co/tutorials/react-setup/

Create a new folder `src/` and within that a `index.js` file with the following content as our base, where we already import `squid-js` and `web3.js`:

```
import React, { Component } from 'react'
import ReactDOM from 'react-dom'
import { Ocean } from '@oceanprotocol/squid'
import Web3 from 'web3'

class App extends Component {
  render() {
    return (
      <div
        style={{ fontFamily: '"Fira Code", monospace', textAlign: 'center' }}
      >
        <h1>
          <span role="img" aria-label="squid">
            
          </span>
          <br /> My Little Ocean
        </h1>
      </div>
    )
  }
}

ReactDOM.render(<App />, document.getElementById('root'))
```



Initial React App

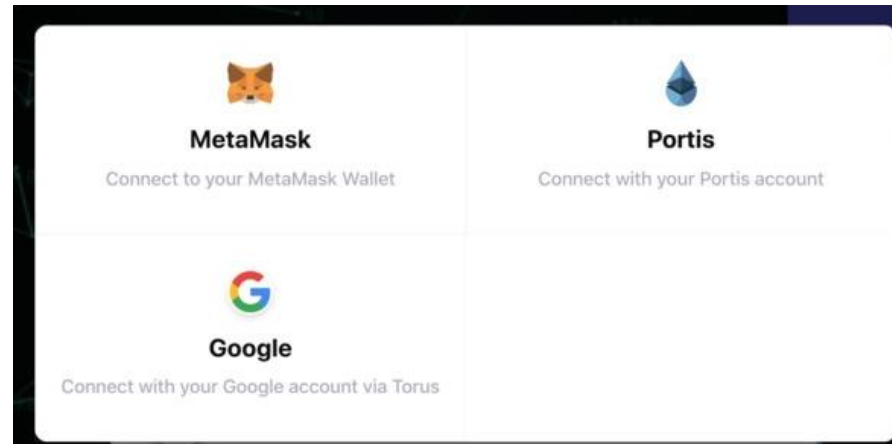
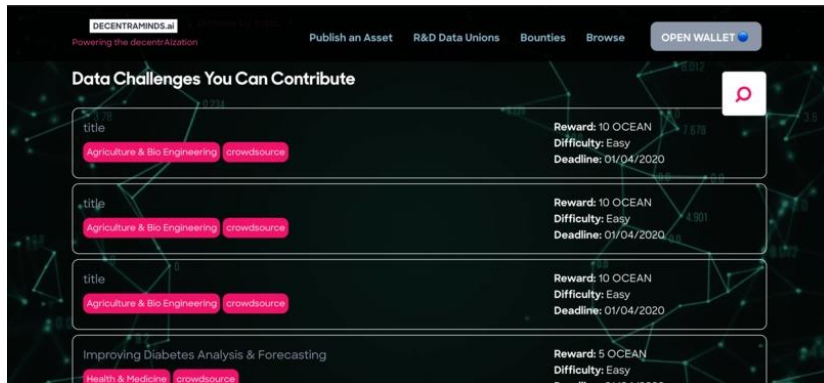
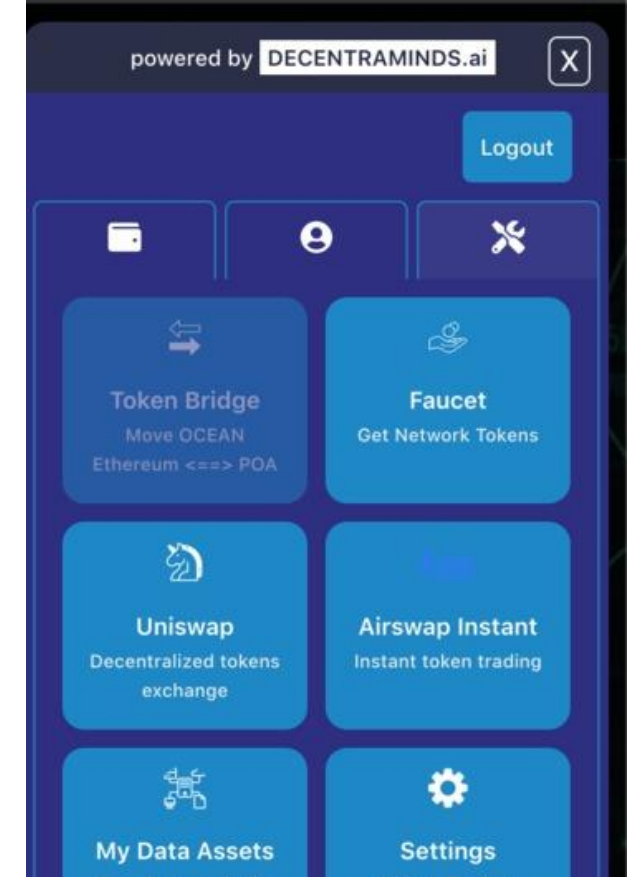
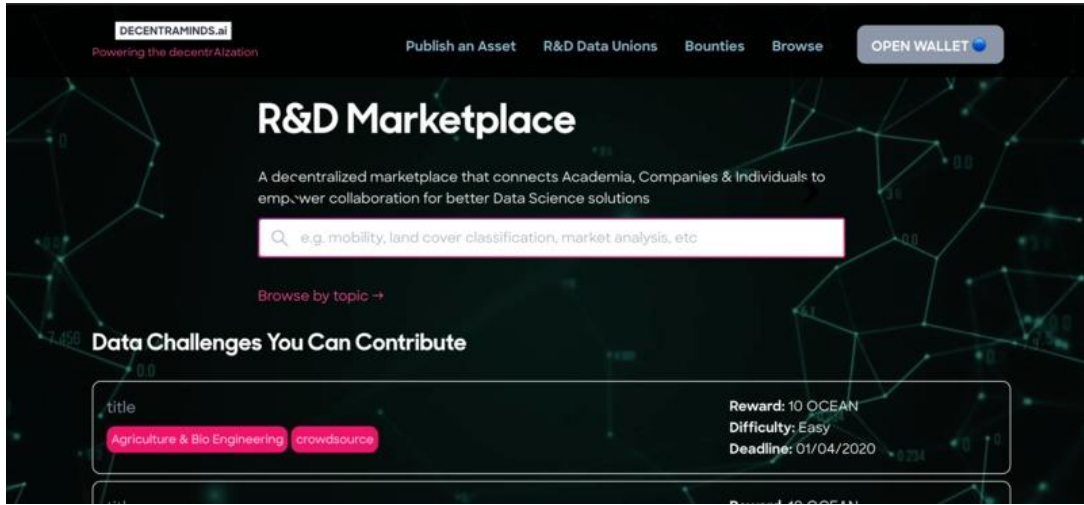


Hackathon Opportunities: Marketplaces



Example: Decentraminds

Self-sustainable research communities through trustless & privacy-preserving infrastructure, where users stay in control of their data assets, build reputation, and receive proper rewards



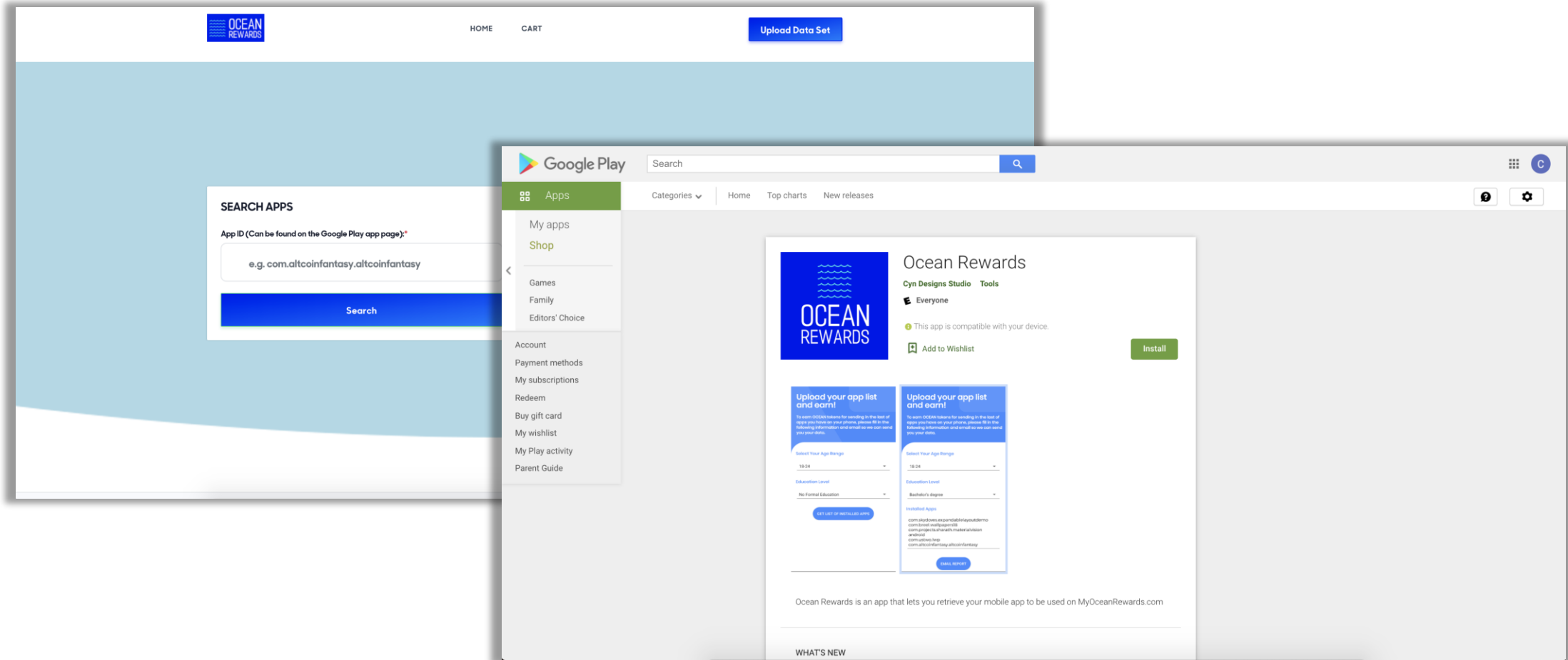
Data challenges

>1 wallets
(Portis: fiat on-ramps)

Data Wallet Tools

Example: Ocean Rewards

A marketplace where consumers can share their mobile app data and get rewarded in OCEAN tokens while app marketers can purchase that data using OCEAN tokens



What type of data marketplace could you build?

Fork an existing token exchange, twist it for data exchange

Fork Ocean Commons, add a killer feature

Marketplace for supply chain data

Bundle datasets into dataset portfolios
(Set Protocol * Ocean)

Market with built-in data exploration

Marketplace for energy data

Price data with bonding curves

Marketplace with DAO-driven data labeling

Marketplace for synthetic data

Price data with channel auctions



Getting started on marketplaces

- **Docs: Quickstart**

<https://docs.oceanprotocol.com/setup/quickstart/>

- **Docs: Set Up a Marketplace**

<https://docs.oceanprotocol.com/setup/marketplace/>

- **Tutorial: Ocean React App**

<https://docs.oceanprotocol.com/tutorials/react-setup/>

- **Commons Marketplace**

<https://github.com/oceanprotocol/commons>





Hackathon Opportunities: Integrations



Example: Molecule Dataswap

A system to crowdfund production of Ocean assets from Molecule research projects, dynamically price assets, and reward contributors to the publisher / research project.

The screenshot displays the Molecule Dataswap interface. At the top, there is a navigation bar with the 'molecule | catalyst' logo on the left and 'Discover', 'My Projects', and 'Application' links on the right. Below the navigation bar, the interface is divided into two columns of project cards.

Left Column:

- Header:** Johns Hopkins Center for Psyched...
- Title:** First Clinical Trial Studying the Effects of Microdosing Psilocybin in a Laboratory Setting
- Status:** ONGOING
- Description:** An advanced placebo-controlled design study to identify whether microdosing provides benefits similar to those provided by psychedelics at higher doses. The primary research t...
- Funding Progress:** 59 % (Funded of 151,500 DAI)
- Image:** A close-up photograph of a hand holding several dried, brown, curved pieces of wood or bark, likely containing mushrooms.
- Project Lead:** PROJECT LEAD BY ROTEM PETRANKER, University of Toronto Psychedelic ...

Right Column:

- Header:** University of Copenhagen
- Title:** Developing Novel Agents Against Malaria
- Status:** ONGOING
- Description:** The H3D collaboration with the Medicines for Malaria Venture (MMV) focuses on delivering potential agents against malaria that will be affordable and safe to use. In line with...
- Funding Progress:** 0 % (Funded of 141,400 DAI)
- Image:** A close-up photograph of a mosquito's legs and body on a human skin surface.
- Project Lead:** PROJECT LEAD BY KELLY CHIBALE, H3D University of Cape Town

Bottom Card (partially visible):

- Title:** Biomarkers for Precision Cancer Therapy
- Status:** ONGOING

Example: ManaTee Slack Integration

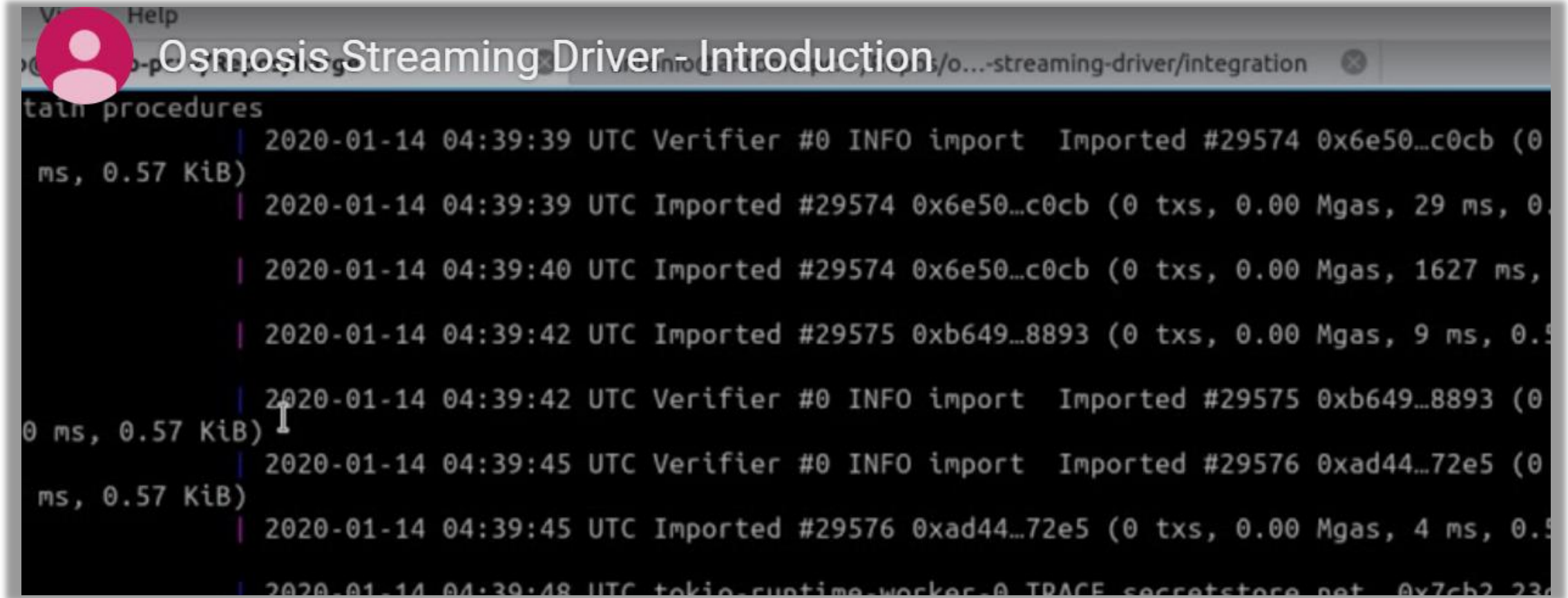
Unlock full capabilities of Ocean Protocol's Marketplaces right within your Slack workspace

The image displays three overlapping screenshots of a Slack workspace integrated with the ManaTee bot:

- Top Left:** A 'Publish in Ocean' dialog box. It prompts the user to fill in details for a data asset, including a title (e.g., 'Trees planted in Amazon in 2019'), a description (e.g., 'This data is about trees planted in Amazon rainforest in the year of 2019.'), and a data URL. A calendar for December 2019 is visible.
- Bottom Left:** A 'Search in Ocean' dialog box. It asks 'Which data assets would you like to search for in Ocean Protocol?' and features a 'Search Query' input field with the example '(e.g.) trees'. 'Cancel' and 'Search' buttons are at the bottom.
- Right:** The main Slack workspace interface for 'ManaTee Of Ocean'. The bot's profile picture is a blue whale. The workspace contains a welcome message and three buttons: 'Publish into Ocean Protocol', 'Search in Ocean Protocol', and 'My Data Wallet'. Below these, search results are shown for 'page-blocks' datasets, including '2010 Census Blocks' and another 'page-blocks' entry, each with details like type, author, and license.

Example: Osmosis Streaming Driver

Take OceanProtocol beyond static assets. Use it to download live streams!



A terminal window titled "Osmosis Streaming Driver - Introduction" showing logs for a "tain procedures" process. The logs include timestamps, UTC, Verifier #0, INFO import, and Imported data with transaction hashes, txs, Mgas, and ms. A cursor is visible on the line for 2020-01-14 04:39:42 UTC.

```
tain procedures
| 2020-01-14 04:39:39 UTC Verifier #0 INFO import Imported #29574 0x6e50...c0cb (0
ms, 0.57 KiB)
| 2020-01-14 04:39:39 UTC Imported #29574 0x6e50...c0cb (0 txs, 0.00 Mgas, 29 ms, 0.
| 2020-01-14 04:39:40 UTC Imported #29574 0x6e50...c0cb (0 txs, 0.00 Mgas, 1627 ms,
| 2020-01-14 04:39:42 UTC Imported #29575 0xb649...8893 (0 txs, 0.00 Mgas, 9 ms, 0.5
| 2020-01-14 04:39:42 UTC Verifier #0 INFO import Imported #29575 0xb649...8893 (0
0 ms, 0.57 KiB)
| 2020-01-14 04:39:45 UTC Verifier #0 INFO import Imported #29576 0xad44...72e5 (0
ms, 0.57 KiB)
| 2020-01-14 04:39:45 UTC Imported #29576 0xad44...72e5 (0 txs, 0.00 Mgas, 4 ms, 0.5
| 2020-01-14 04:39:48 UTC tokiu-runtime-worker-0 TRACE secretstore.net 0x7cb2 23d
```

Opportunities: Web3 integrations

Integrate Filecoin,
Ethereum Swarm,
Storj, Sia



Integrate bots from
fetch.ai, SEED, or
SingularityNet



Integrate Chainlink
datafeeds (start with
OP's prototype)

Integrate Enigma's
SGX compute



STORJ.IO

Integrate DeFi: Compound loans,
Uniswap exchange, Synthetix
synthetic assets, ...

enigma



ocean

Opportunities: Data science integrations

Build private models. Run sklearn model-building next to private data



Sell model. Build model with TF, then sell it.



Provenance. Post ≈ 10 intermediate model training results to chain

Buy data on-the-fly, then feed into TF



Integrate Ocean into Anaconda Cloud

Integrate into OpenML and its 20,000 datasets

Data cleaning. Grab raw data, clean data and post for sale



Getting started on integrations

- **Docs: Jupyter Notebooks**

<https://docs.oceanprotocol.com/tutorials/jupyter-notebooks/>

- **Blog: Project Manta Ray — Data Science powered by OP**

<https://blog.oceanprotocol.com/project-manta-ray-data-science-powered-by-ocean-protocol-535c54089b0f>

- **GitHub: mantaray**

<https://github.com/oceanprotocol/mantaray>

- **GitHub: mantaray_utilities**

https://github.com/oceanprotocol/mantaray_utilities

- **Docs: Set up Azure Storage**

<https://docs.oceanprotocol.com/tutorials/azure-for-brizo/>



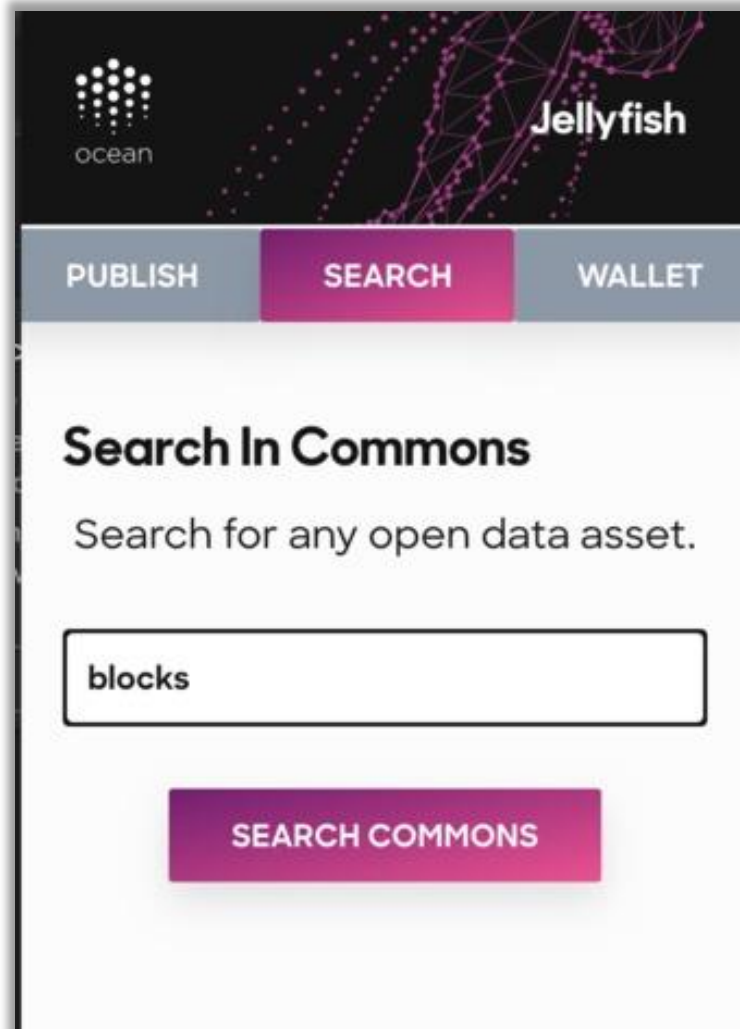
Hackathon Opportunities: Wild Cards



Example: Jellyfish Cross-Browser Extension

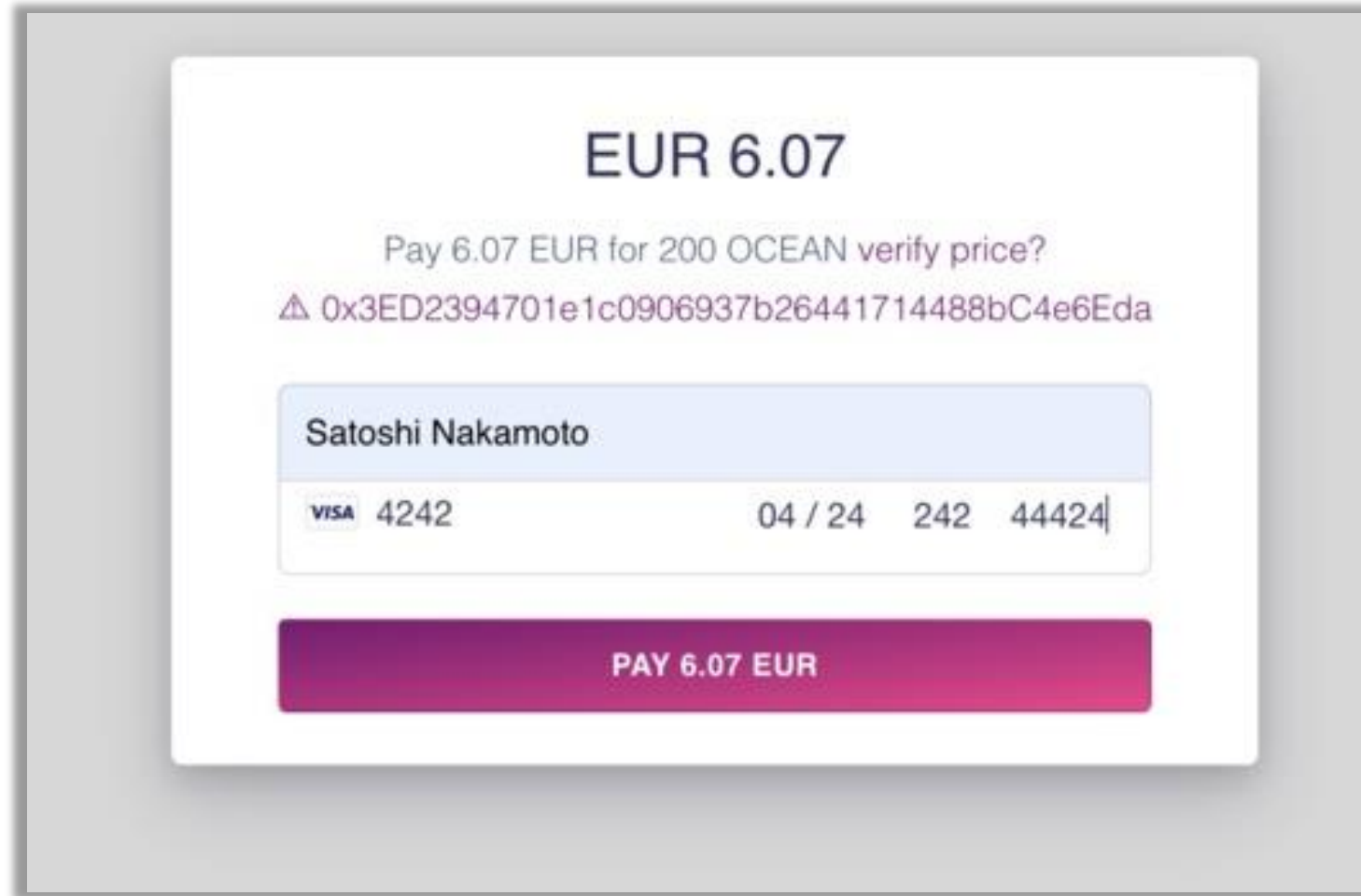
(Chrome, Firefox, Brave)

Bring power of OP's Commons Marketplace and Pacific network right into your workspace



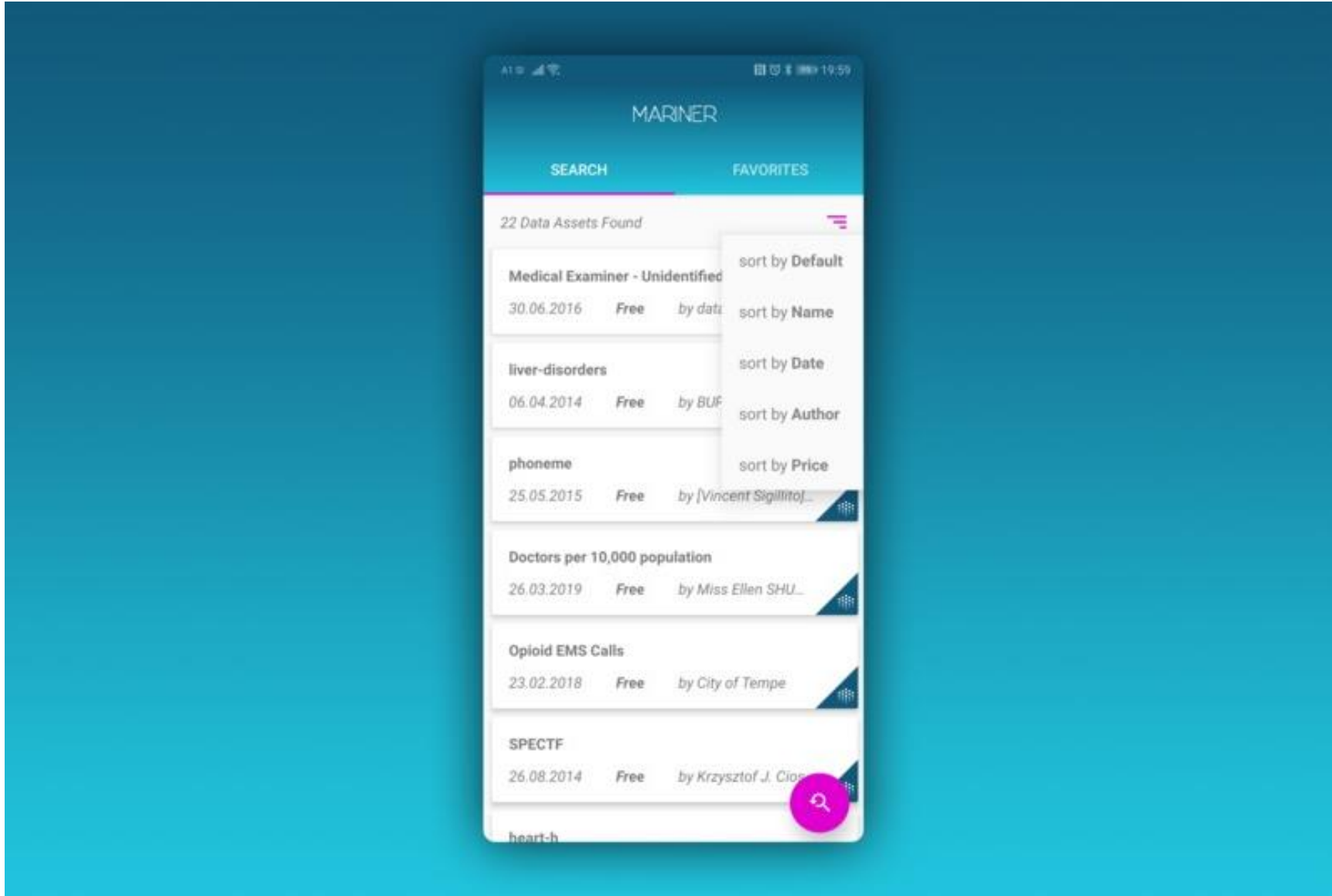
Example: PayFiat

Pay for Ocean Protocol's data assets with your credit card in fiat currency without knowledge of cryptocurrencies



Example: Mariner

The Ocean Protocol explorer for Android.



What sort of Wild Card could you build?

An Ocean **block explorer** with **integrated dataset visualization** e.g. with Metabase

Data DAOs to govern data

Data wallet in the browser

Data insurance

Borrowing data
Loaning data

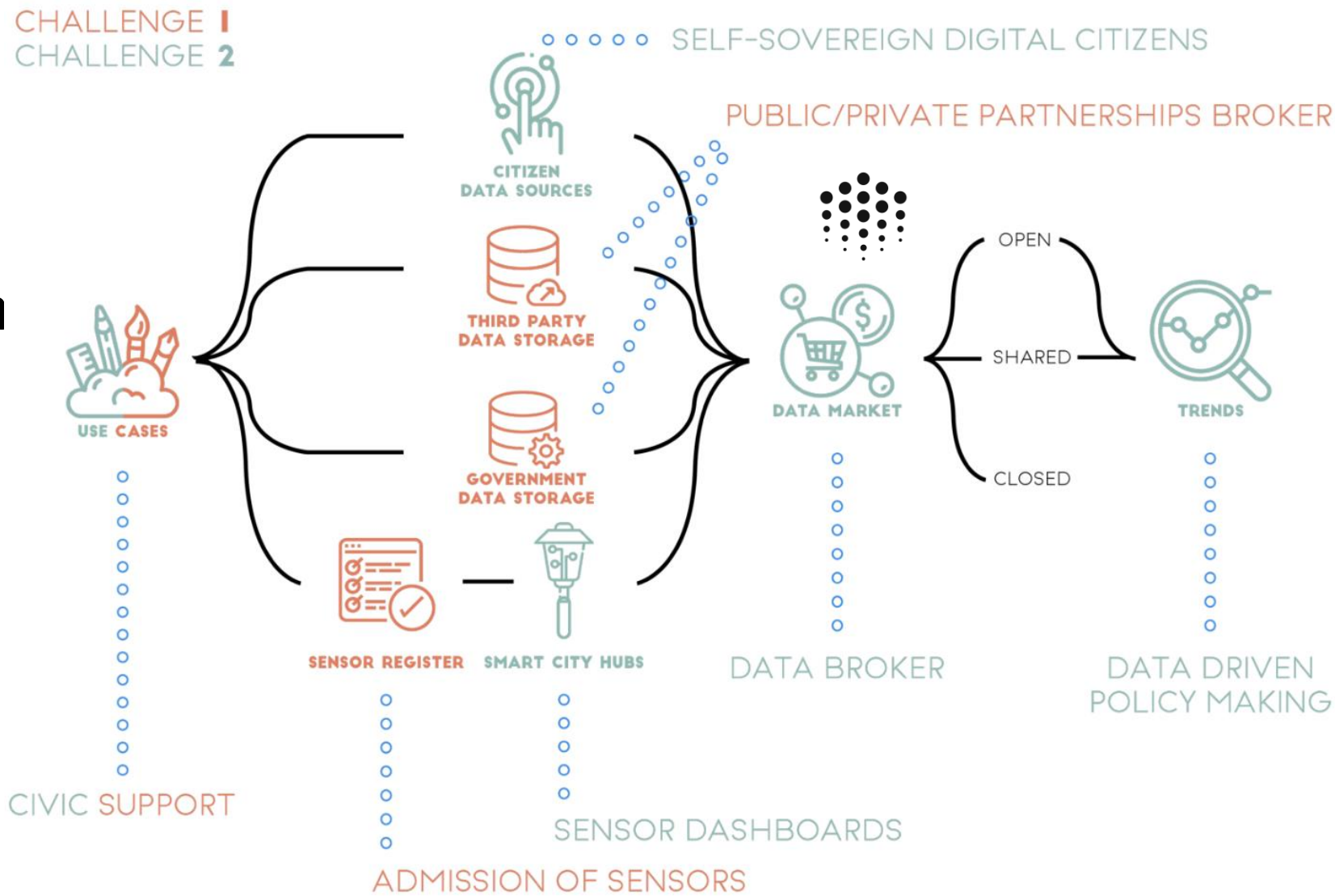
Data-backed **stablecoins**

The background of the slide features several jellyfish of various species and sizes, illuminated with a blue light. In the upper left, there is a large, elongated jellyfish with a prominent internal structure. To its right is a smaller, more rounded jellyfish. In the upper right, a large, flat, disc-like jellyfish is visible. In the lower right, another large jellyfish with a distinct internal pattern is shown. The overall scene is set against a dark, deep blue background, creating a serene and ethereal atmosphere.

Conclusion

Role of Ocean at Odyssey

- Data Market module
- API to publish, query, consume, transfer data
- Tech support



Conclusion

Ocean in a Nutshell

- **Safely & securely exchange data, without loss of privacy**
- A public utility network to connect AI / data suppliers & consumers
- Data marketplaces in-a-box
- Buy & sell *private* data, while protecting privacy
- Rethink data custody: “not your keys, not your data”

Let Ocean help you build something amazing at Odyssey!

docs.oceanprotocol.com