bytEM

Scaling to global Data Exchange & Management

LIBERBYTE
FREE YOUR DATA

Oct 2025

Exponential x^2 pa growth in global data volumes creates various **problems**:

- **Identifying** (suitable) data **is** increasingly **difficult**
- **Search** engines **finds fraction (<5%) of** the **web**
- **>85%** of new data is **unstructured**
- **No** (business) **metadata standards**
- **Data** stored & "worthless" **in silos**
- **Transferring** large volumes **inefficient**
- AI repeat of **"fractioned app" landscape**
- **Growing DWHs* or LLMs not a solution**

Global data volumes in Zettabyte*

Year	Value
	2
	5
	6,5
	9
	12,5
	15,5
	18
	26
	33
	41
	64,2
	84,5
	103,66
	126,32
2023*	153,52
2024*	188,03
2025*	230,27
2026*	284,3
2027*	

Data hidden is data wasted. That's information asymmetry.

* https://www.nature.com/articles/44937
  https://www.researchgate.net/figure/Growth-of-data-variety-by-years_fig4_313400371
  https://de.statista.com/statistik/daten/studie/267974/umfrage/prognose-zum-weltweit-generierten-datenvolumen/

*DWH = Data Warehousing

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Organisations have simply <u>no</u> or <u>wrong</u> Approach on data products & value extraction, for example:
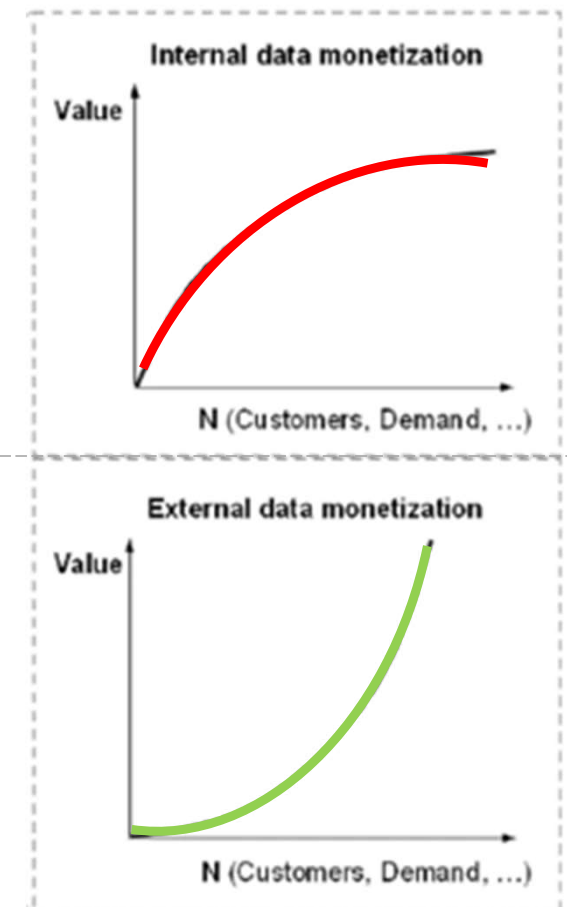
- **indirect internal approach**

providing *diminishing* **returns**

instead

- **indirect external approach,**
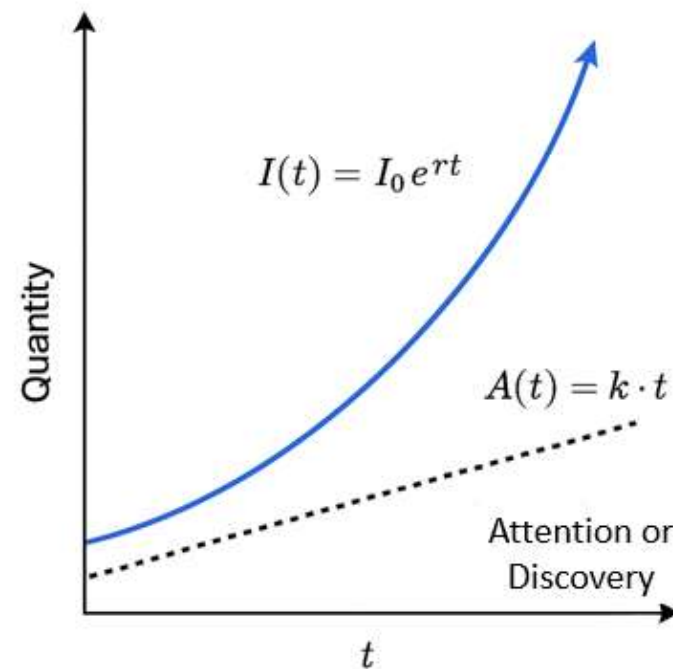- **direct external approach**

which provide *increasing* **returns**

Data exchange capabilities enable demand driven value extraction

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"Asymmetric information creates inefficiencies that markets strive to overcome."

— George A. Akerlof, *The Market for Lemons* (1970)

$$I(t) = I_0 e^{rt}$$

$$A(t) = k \cdot t$$

Attention or Discovery
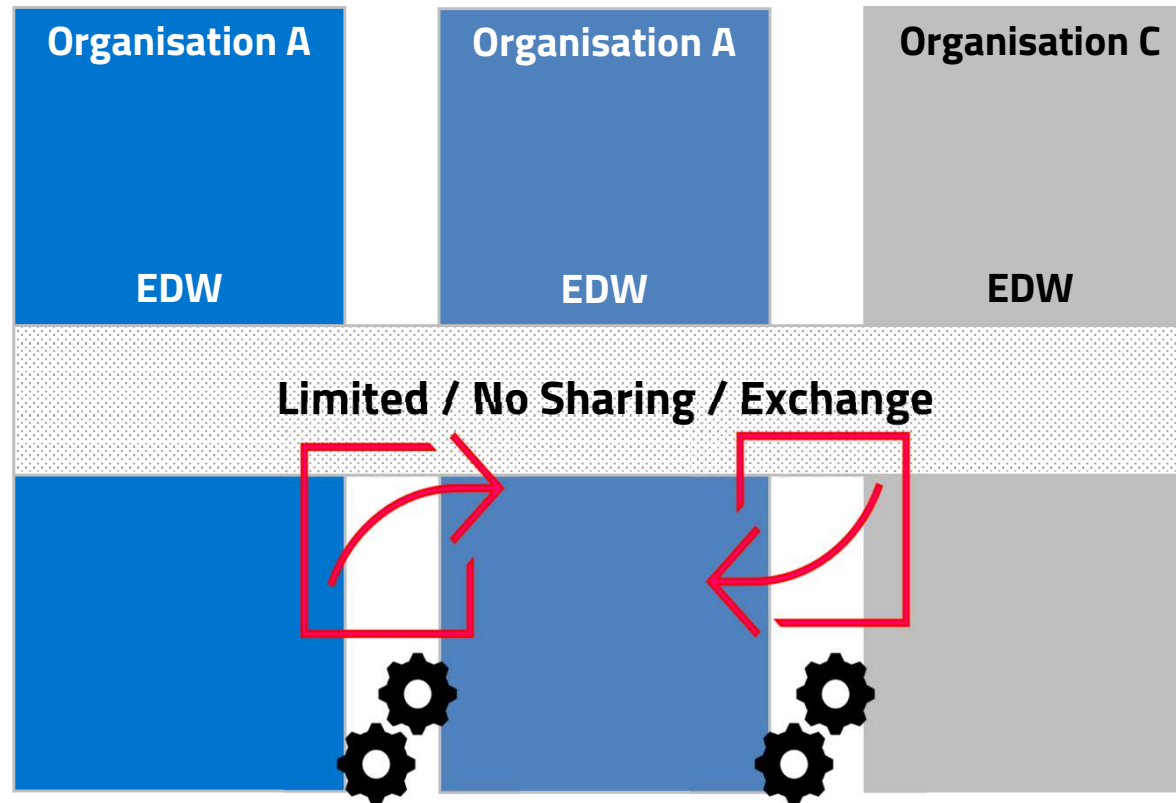
Quantity (y-axis), *t* (x-axis)

"As time progresses, the amount of data far outpaces our ability to **find**, **process**, or **understand** it. Therefore, **information asymmetry isn't a bug—it's a mathematical consequence** of exponential data growth" (T. Salomaa)
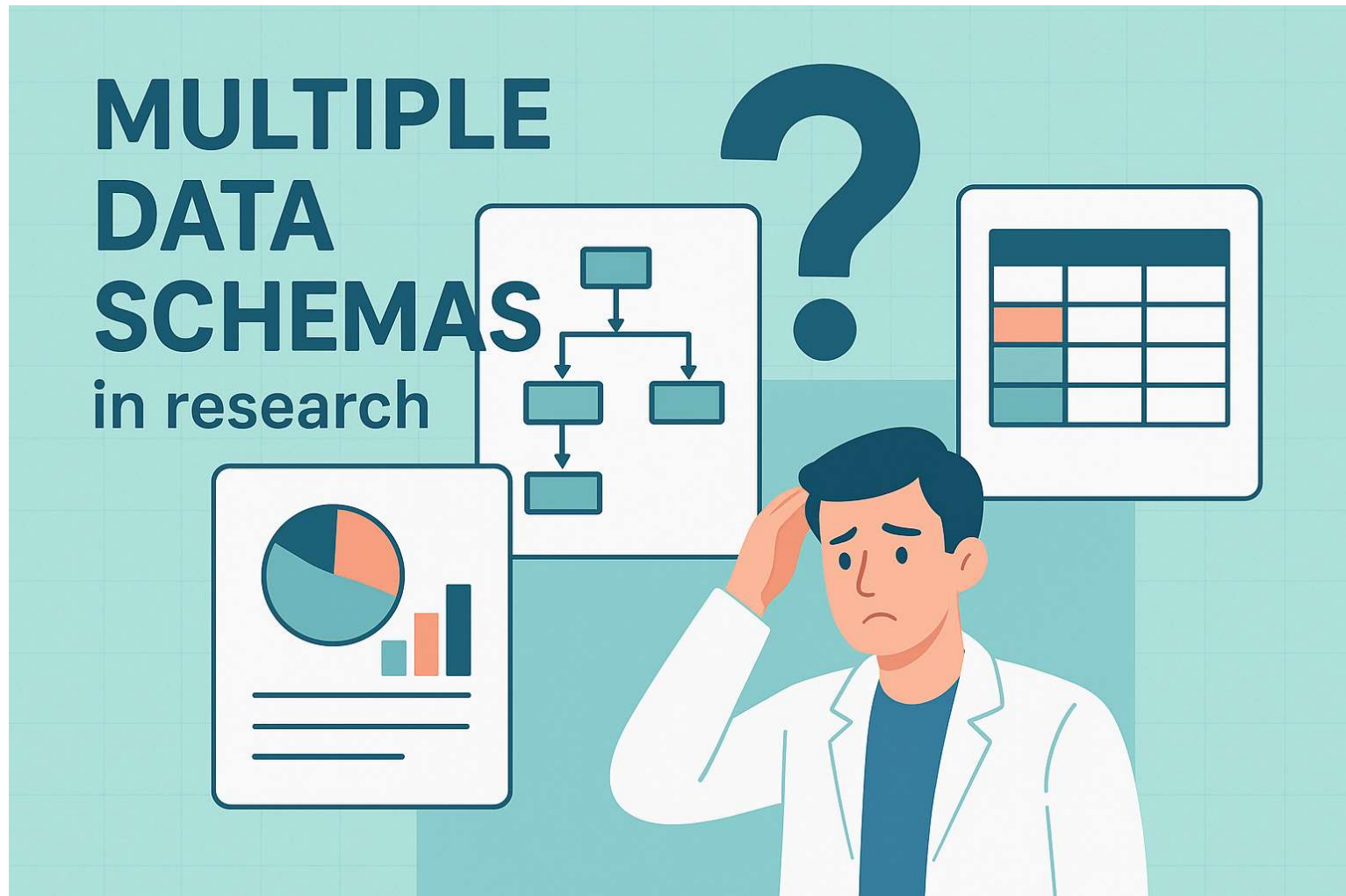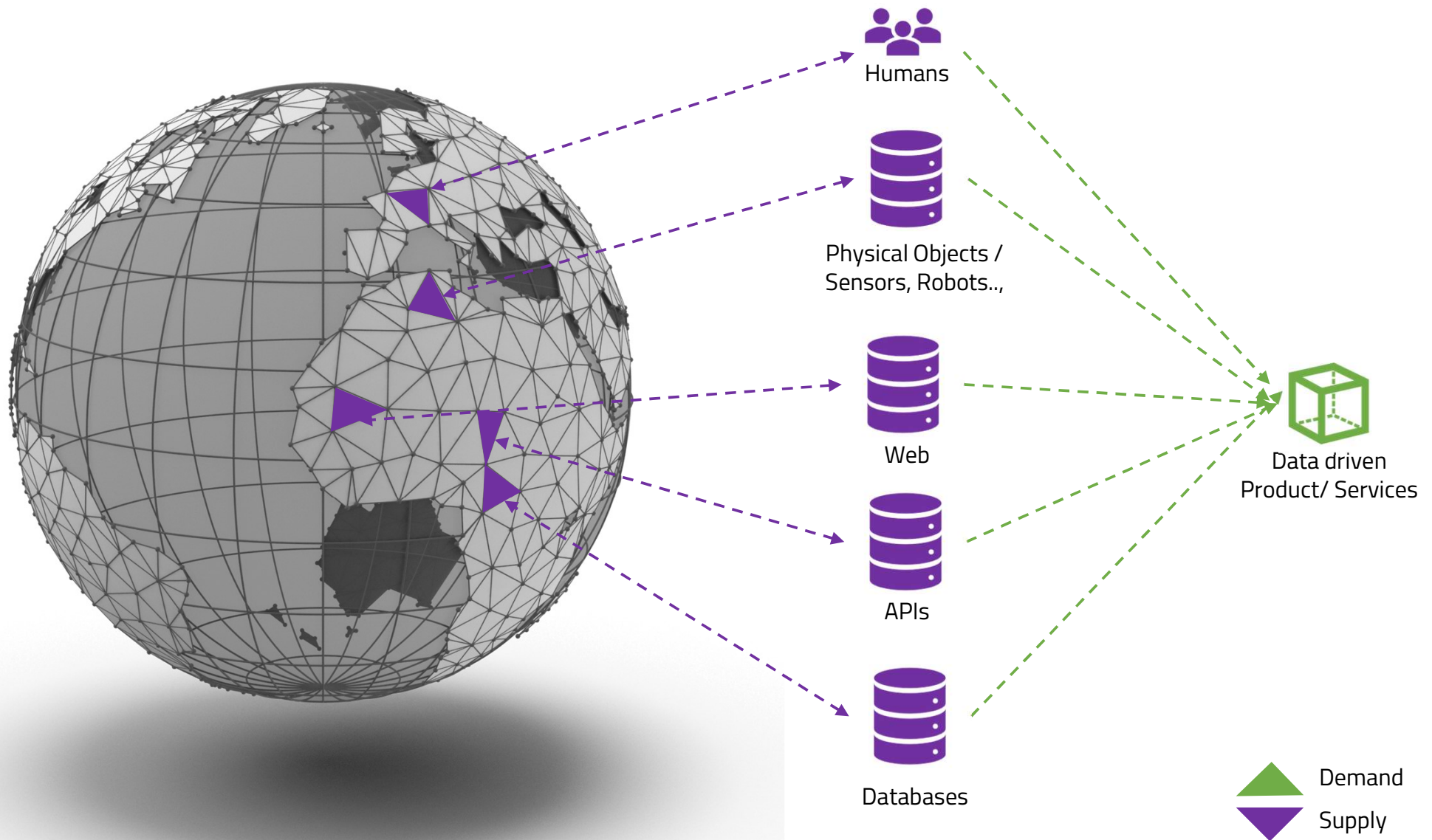
Who sets the (business) schema?

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Centralised (read in) - no sharing by default


EDW = Enterprise Data Warehouse

Data is „Decentralised"

Humans

Physical Objects / Sensors, Robots..,

Web

APIs

Databases

Data driven Product/ Services

Demand

Supply

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No Context / Business / Science etc. Domain

"Environment", "Ecosystem", "Proteins", "Microbes",…

LIB≡RBYT≡

Input Data and Data mgmt NOT controlled → AI NOT controlled

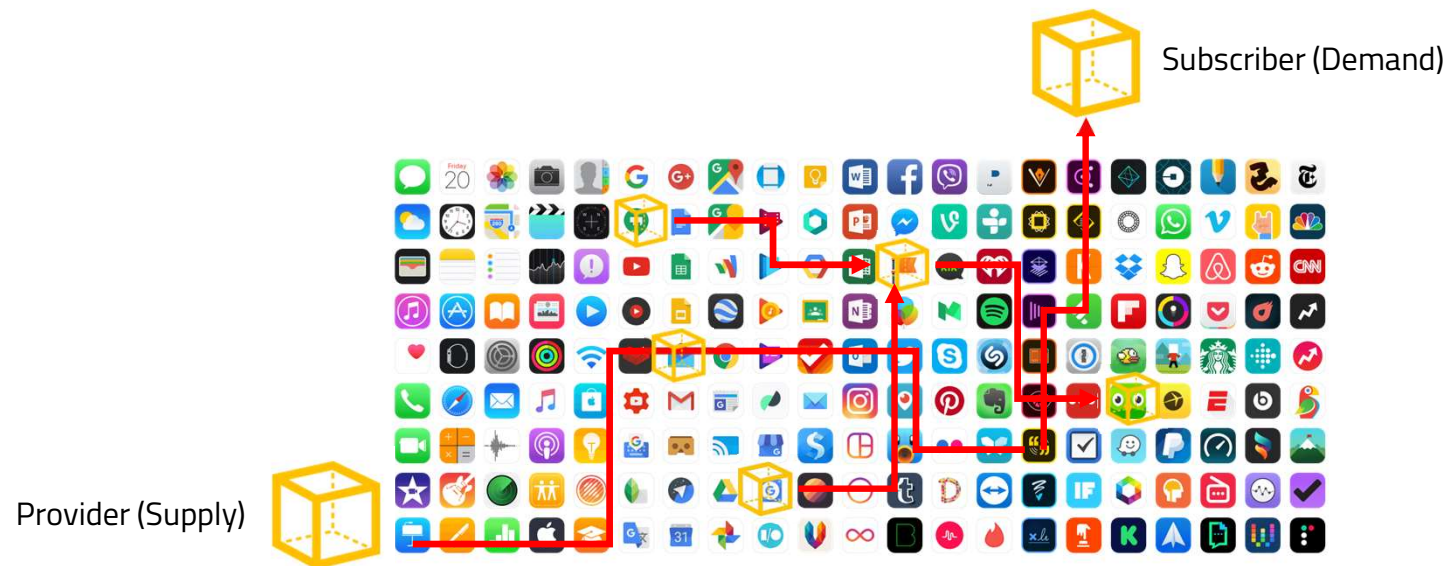Data & AI - „uncontrolled & not reproducable / „Lab like"
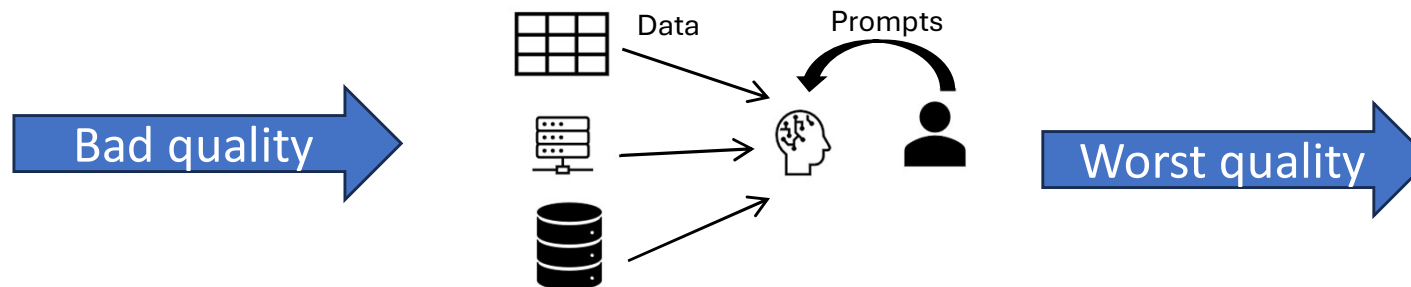
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5.0 Trillion USD

Combined size of global data economies in 2025

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The need to exchange data is greater than ever...
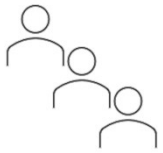
How to enable exchangable Data Products & Services?

Subscriber (Demand)

Provider (Supply)

Solution: exchangable data rooms + business (domain) context + interoperable architecture.

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Liberbyte's **bytEM**

Provider
(supply)

Subscriber
(demand)

[matrix]

[matrix]

[matrix]

[matrix]

100% Open Source Stack as Docker Install

https://github.com/liberbyte/bytEM-public
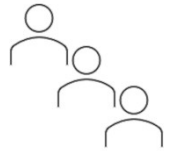
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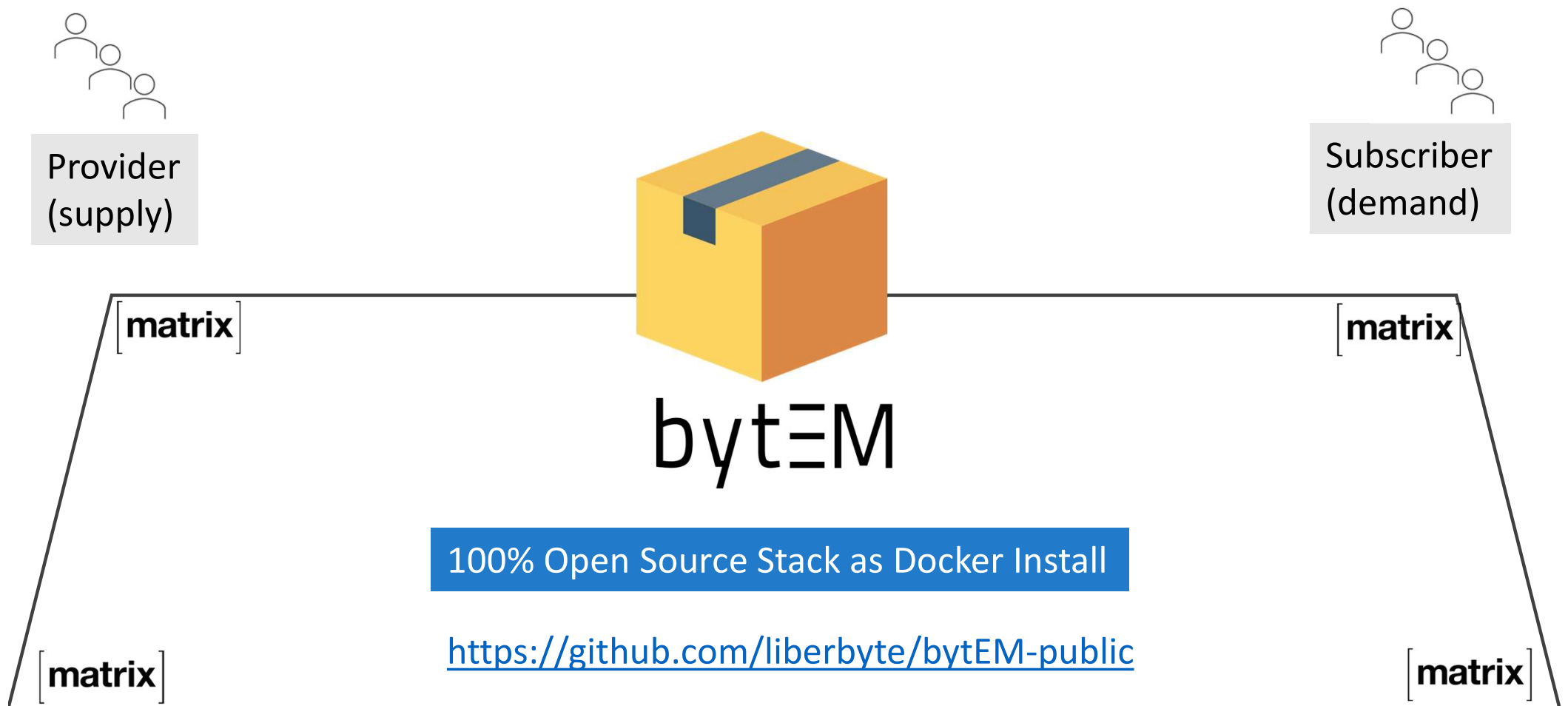
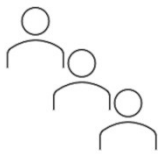# World needs to connect supply & demand i.e. "match provides to subscribers" for data

Provider
(supply)

Subscriber
(demand)

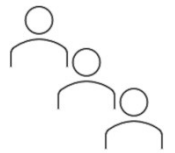LIBERBYTE

The internet and HTTP(s) layer are already there for connecting parties...
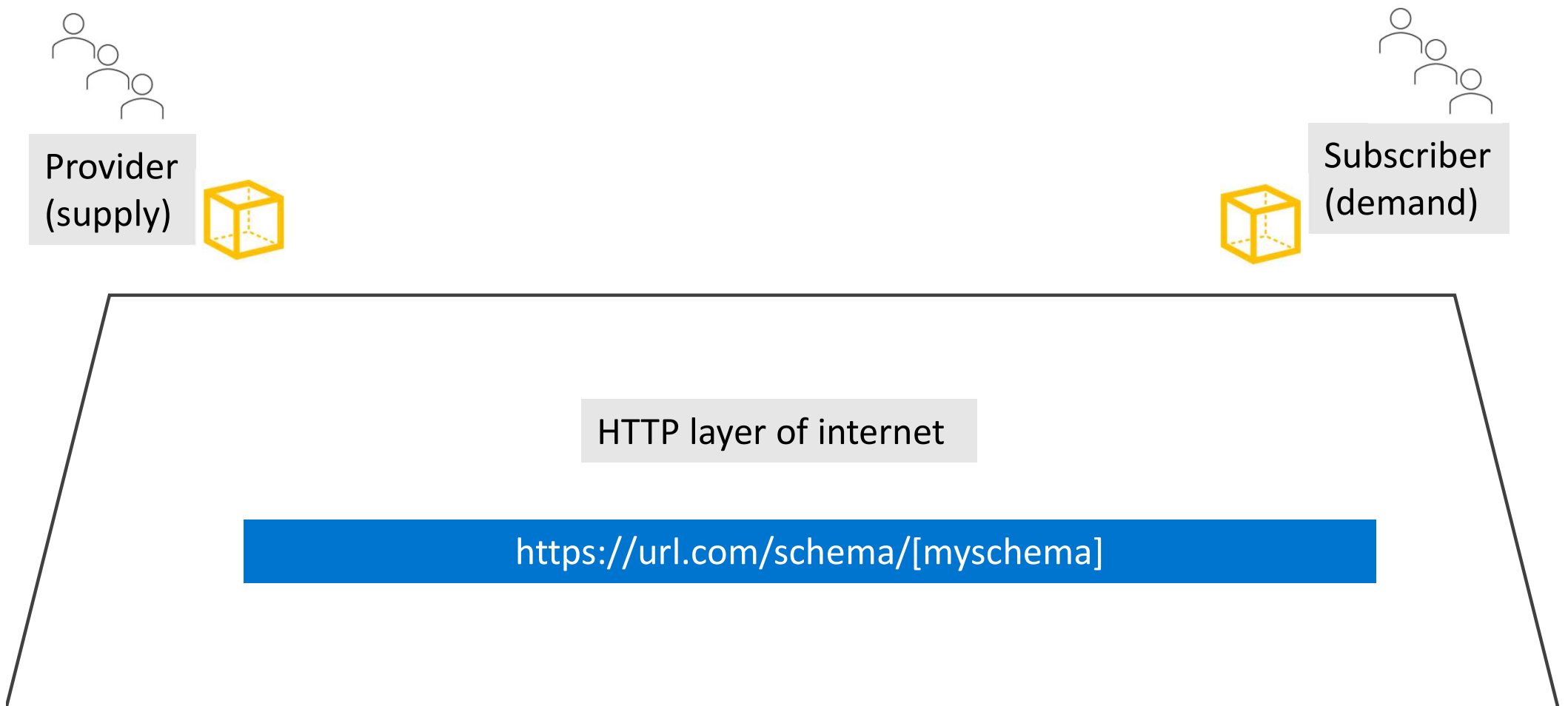
Provider
(supply)

Subscriber
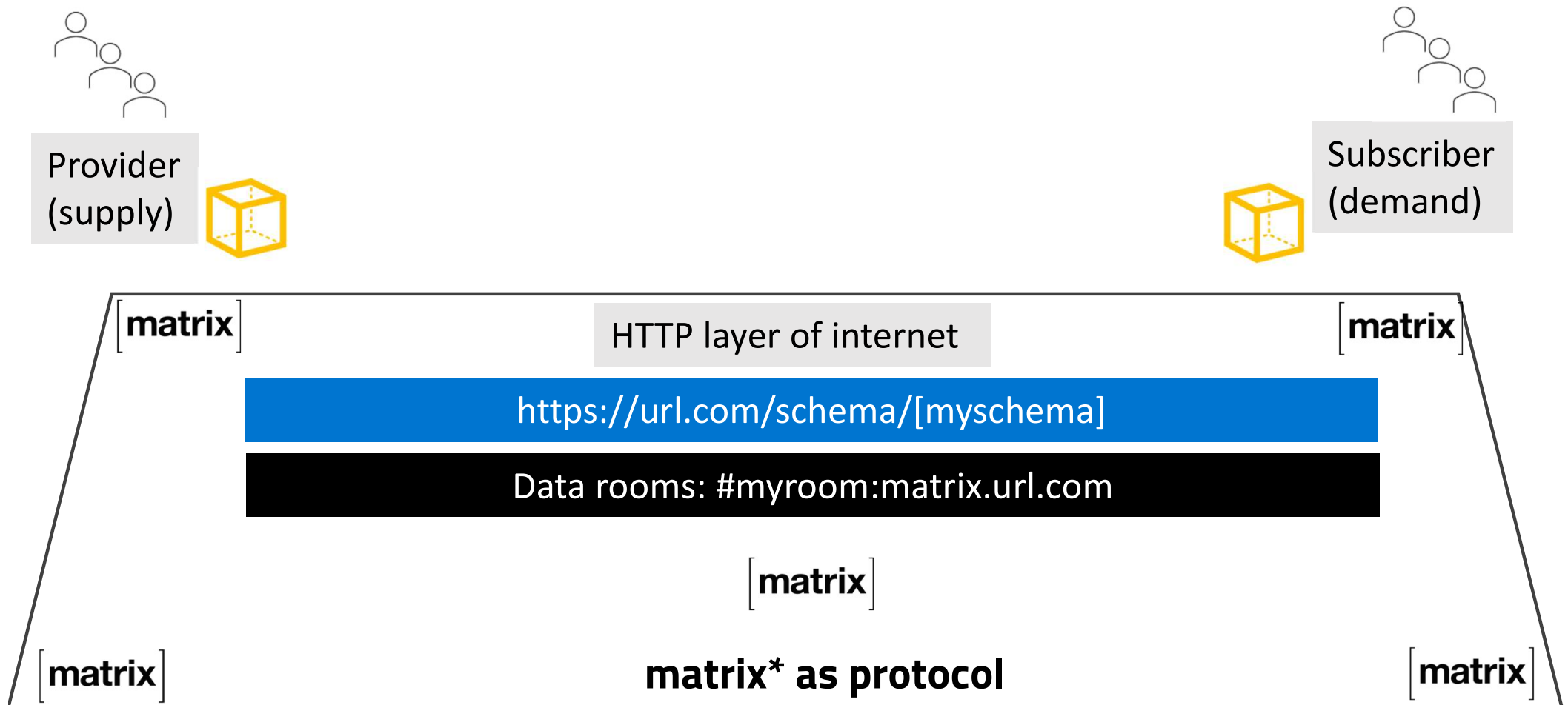(demand)

HTTP layer of internet

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...yet you still need to tie the business and exchange semantics to (web2) / URL system...

Provider (supply)

Subscriber (demand)

HTTP layer of internet

https://url.com/schema/[myschema]

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...and then mix in globally accessible data rooms, using standard communication protocol [matrix]

Provider (supply)

Subscriber (demand)

[matrix]

HTTP layer of internet

[matrix]

https://url.com/schema/[myschema]

Data rooms: #myroom:matrix.url.com

[matrix]

[matrix]

matrix* as protocol

[matrix]

* https://matrix.org   LIBERBYTE

Liberbyte's platform builds on $\lceil$**matrix**$\rceil$ **standard***
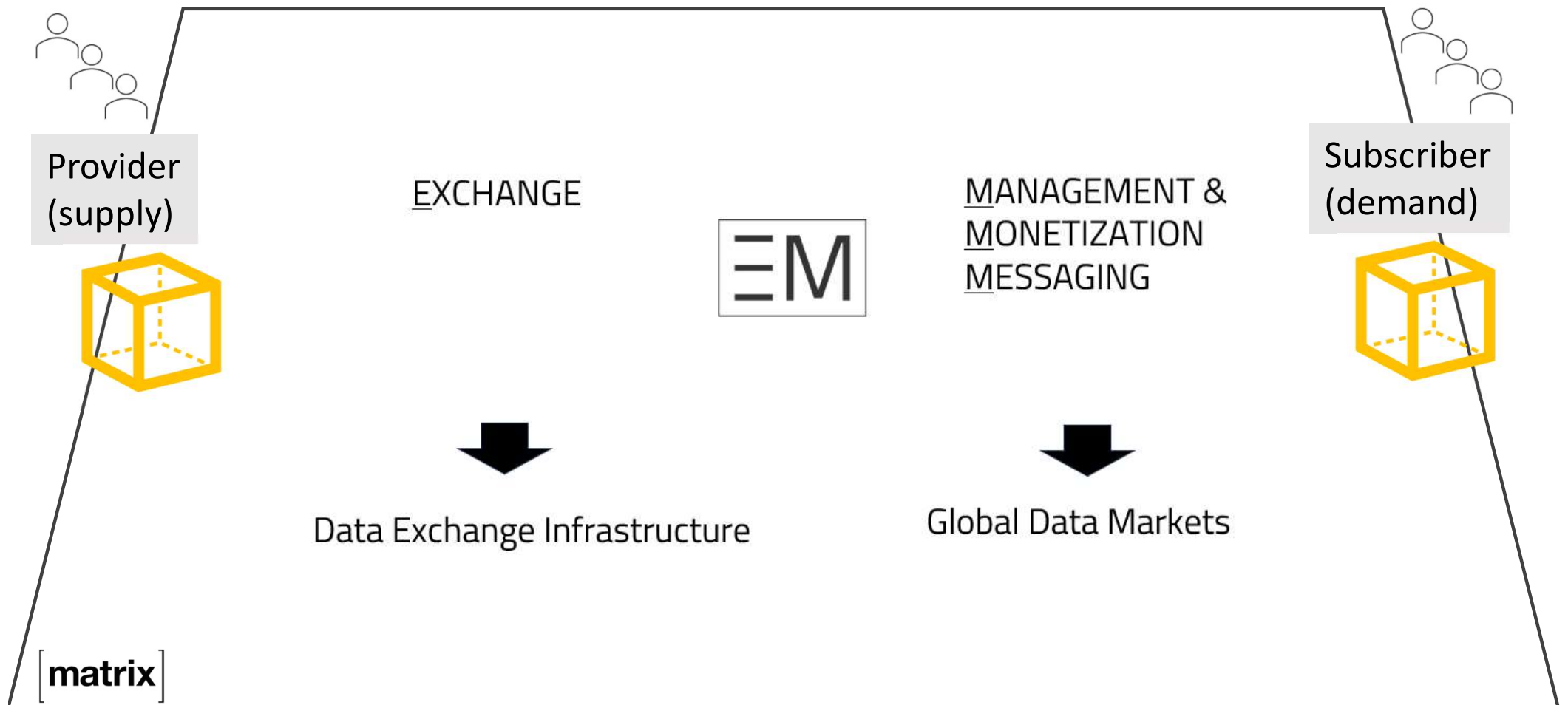**(with +150m users and growing rapidly)**

+150m

- Open-source project for secure, decentralized communication
- +150m users, ~17m rooms, ~64k servers
- Matrix is Liberbyte's technical platform engine and enables open data exchange

Matrix User development

2018   2019   2020   2021   2022   2025

Used by, e.g.:

Ministry of Defence · RÉPUBLIQUE FRANÇAISE · BUNDESWEHR · NATO OTAN · UN · moz://a · redhat · EFF · WIKIMEDIA

gematik · Government Offices of Sweden Ministry of the Environment · dataport · Ukraine · GNOME · Linux · KDE · Rust · debian · ANSIBLE · Ubuntu

ByCS · ERICSSON · THALES

* https://matrix.org   *Matrix Übersicht:
https://drive.google.com/file/d/18YSlh5Uv2YMb6QaLi4fFu7Xv1uSWKAo7/view   LIBERBYTE

…hence enabling bytΞM to **Exchange**, **Manage**, **Monetize** and **Message** data

Provider (supply)

Subscriber (demand)

EXCHANGE

ΞM

MANAGEMENT & MONETIZATION MESSAGING

Data Exchange Infrastructure

Global Data Markets

[matrix]

bytEM as 100% opensource solution for any individual or organization...

Provider (supply)

Subscriber (demand)

bytEM

bytEM

bytEM

[matrix]

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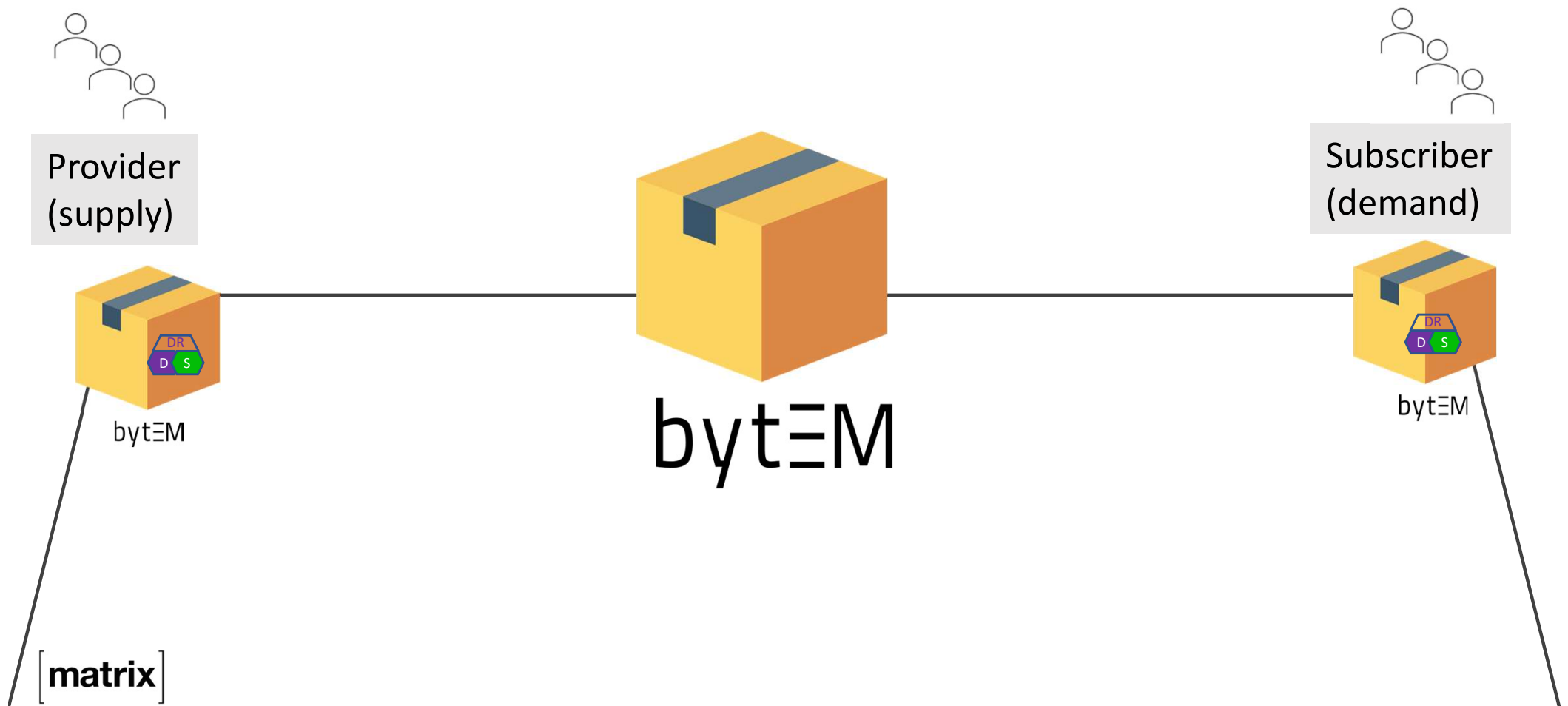
to connect data supply & demand over matrix's federated network*...

*email server network is a known federated network

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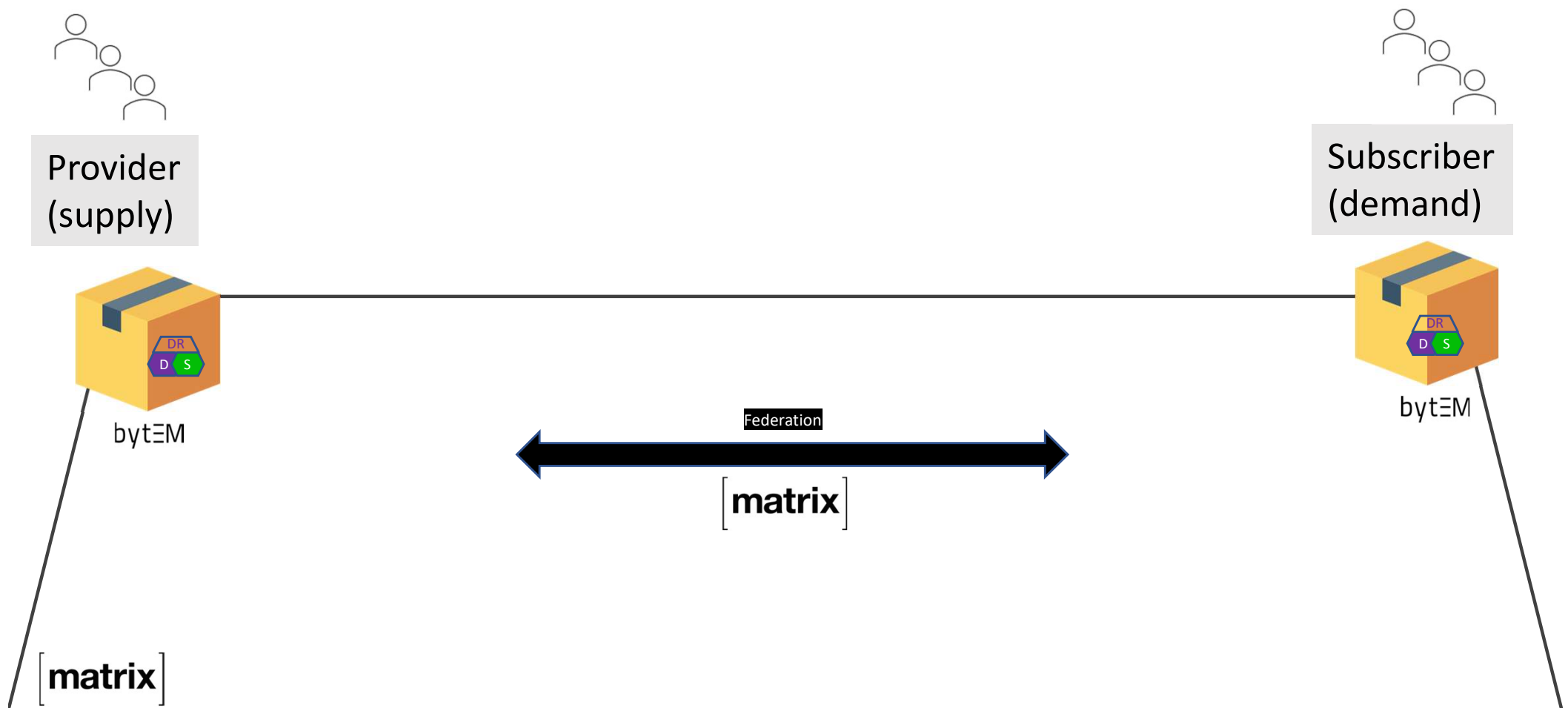
...enabling data (supplies) to be shaped into data (demand) products and exchanged...

Provider
(supply)

Subscriber
(demand)

bytΞM

bytΞM

Federation

[matrix]

[matrix]

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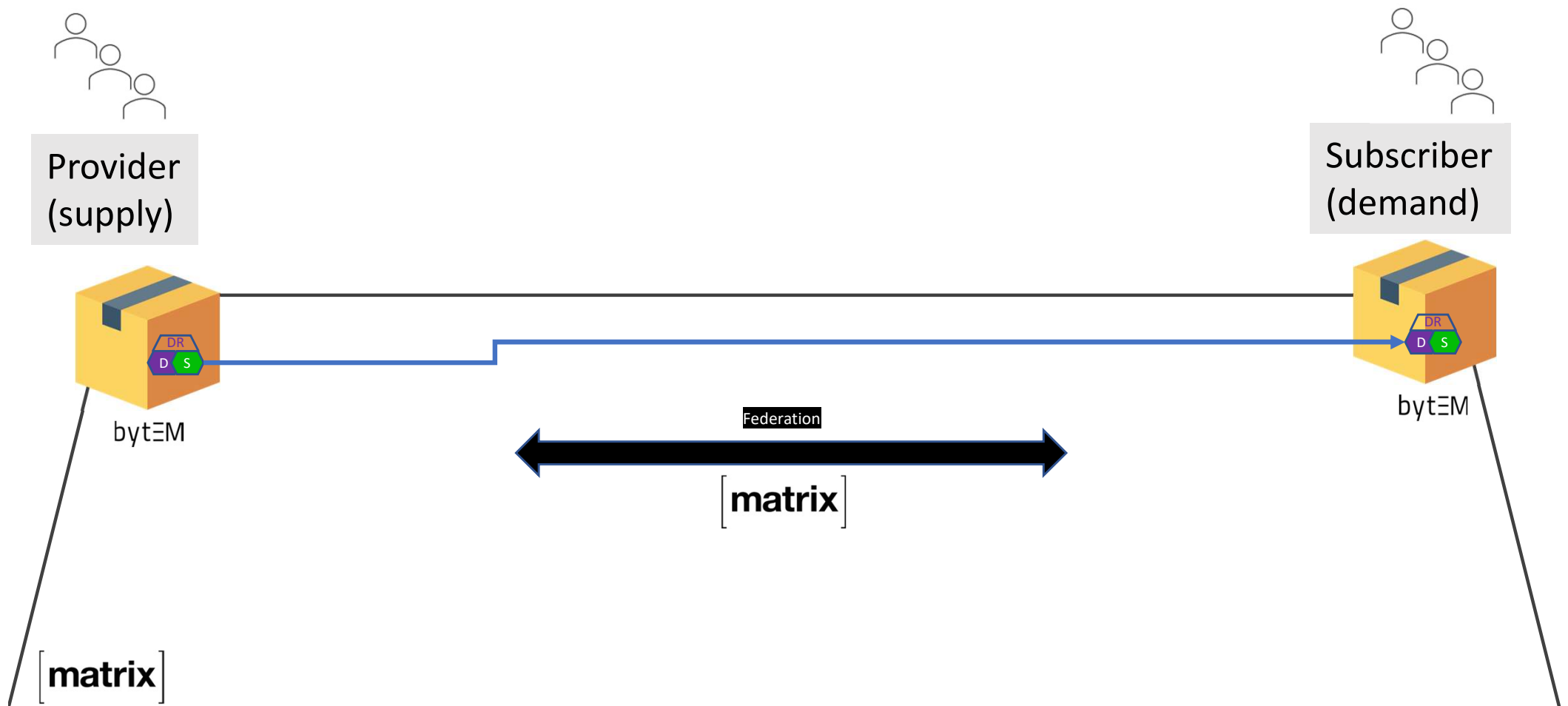
...via decentralized Network of bytEMs (**globally**)

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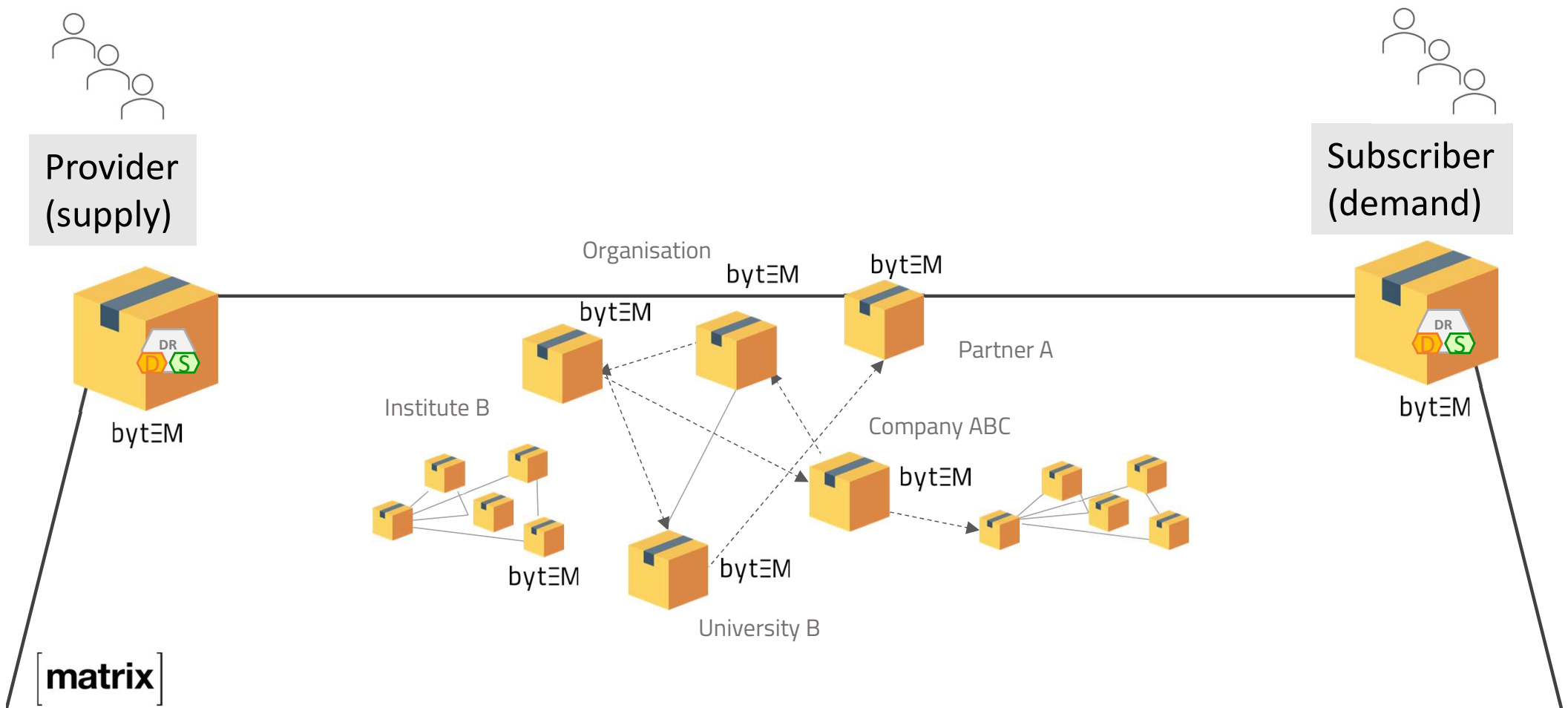
bytΞM live demos @ request
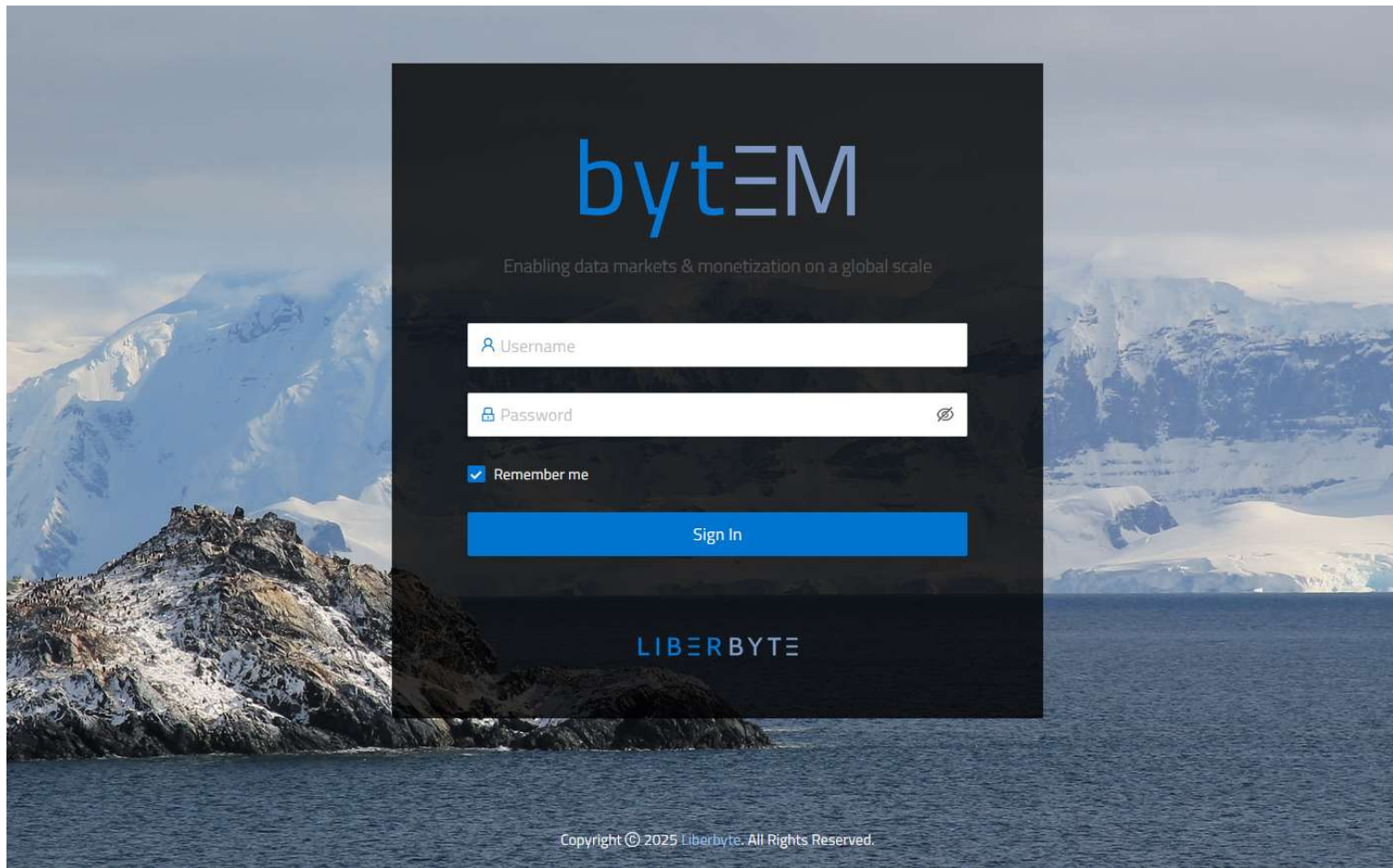
For bytEM Partners

Where are we on the journey?

- Next iteration of **bytEM** launching in October 2025.

- AGPL public version from 10/2025: https://github.com/liberbyte/bytEM-public

What are we looking for?

- **bytEM** pilots on non-commercial basis for NGOs/communities/universities/public authorities.

- **bytEM** product adoption for real scientific data management / exchange and discovery problems including applying AI (of your choice) with active / ongoing user feedback

Abstract

Abstrakt - DE

- **byt**EM ist eine offene, modulare Plattform für das Datenmanagement, die dezentrale Datenhoheit mit zentralen Standards vereint. Organisationseinheiten behalten die Kontrolle über ihre Datenräume und bestimmen selbst, welche Daten sie wie veröffentlichen – innerhalb eines Rahmens aus gemeinsam genutzten Metadaten-, Lizenz- und Workflow-Standards. Besonders im Fokus steht dabei der kontrollierte Datenaustausch: **byt**EM ermöglicht die sichere und flexible Zusammenarbeit zwischen Einheiten und externen Partnern, z. B. durch projektbasierte Datenräume mit fein justierbarem Zugriffsmanagement. Daten können automatisiert oder „on-demand" publiziert, geteilt und kombiniert werden – auch KI-gestützt oder als dynamische Datenprodukte. Dabei unterstützt **byt**EM sowohl interne Workflows als auch föderierte Netzwerke und Drittsysteme. So wird kollaborative, transparente und reproduzierbare Arbeits-/Datenmanagement basis auf Basis eines flexiblen Daten-Ökosystems realisierbar – ohne Daten aus der Hand zu geben.

Abstract EN

- **byt**EM is an open, modular platform for data management that combines decentralized data ownership with centralized standards. Organizations maintain full control over their data spaces and decide how and what to publish – all within a shared framework of metadata, licensing, and workflow policies. A key focus is on controlled data exchange: **byt**EM enables secure and flexible collaboration between internal teams and external partners via project-specific data spaces and customizable access control. Data can be shared, published, and combined either automatically or on-demand – including AI-supported or dynamically generated data products. **byt**EM supports both internal workflows and federated networks, allowing integration with third-party systems. This makes collaborative, transparent, and reproducible data exchange / management possible – without giving up control over the data.

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website:	www.liberbyte.com
bytEM intro:	www.liberbyte.com/bytEM.html
bytEM install:	https://github.com/liberbyte/bytEM-public
matrix room (help):	https://matrix.to/#/#bytem-install-admin:matrix.liberbyte.com
contact:	info@liberbyte.com

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