

# Blockchain in Healthcare

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# What was supposed to happen

**Blockchain Technology Adoption Timeline Across Major Healthcare Applications/Use Cases, Global, 2016–2025**

Immediate (2016–2018)	Short-term Future (2018–2021)	Long-term Future (2021–2025)
Digital Identity Verification/ Management	IoMT (medical asset management and device data exchange)	IoMT (Quantified self, home care)
National Medical/ Health Records (authenticity and integrity)	Smart Contracts (health vendors RFPs and contract management)	Universal Health Records and Identities
Drug Supply Chain Provenance (drug counterfeiting and theft)	Health Token (HSN, research, wellness incentives)	Genomics and User-generated Data Management
Claims Adjudication & Billing Management/ RCM	Managing Pharma/Biopharma IP and Assets Transactions on Blockchain	Blockchain AI and AR/VR Applications
eConsenting (Research and clinical trials)	Clinical Trials Records Integrity and Exchange	Blockchain-based Wellness, Personal Coaching
Healthcare Data Storage, Access, and Analytics (on/off Blockchain)	Regulatory Audit and Adverse Event Safety Monitoring	Health Policy Voting
<p>Note: Blockchain system adoption across these healthcare use cases demonstrate more convincing opportunities, albeit at varying degrees of adoption across countries and health systems.</p>		Blockchain-based Learning Health Systems and Advocates

**Key: Certainty of Adoption**



# What is actually happening

2022

2023-4

Healthcare Data Storage, Access,  
and Analytics (on/off Blockchain)

Digital Identity Verification/  
Management

eConsenting  
(Research and clinical trials)

?

IoMT  
(Quantified self, home care)

Universal Health Records and  
Identities

Genomics and User-generated Data  
Management

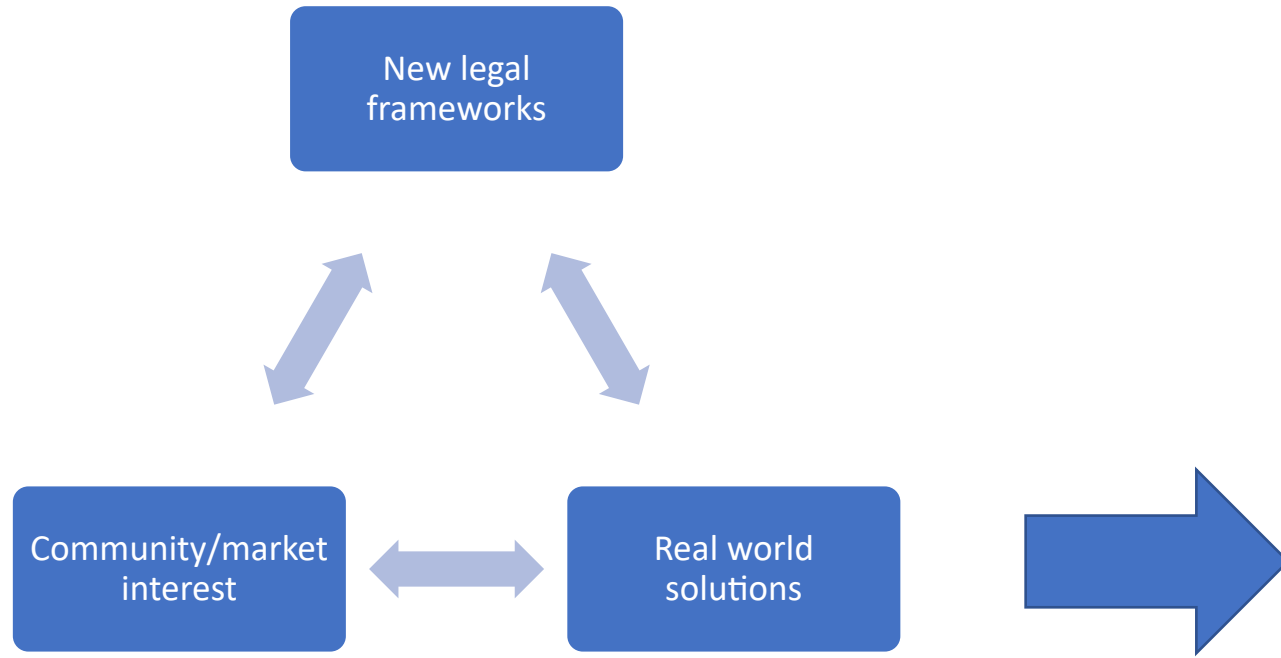
Blockchain AI and AR/VR  
Applications

Blockchain-based Wellness,  
Personal Coaching

# What also happened

- Web 3.0:
  - Distributed data systems
  - Crypto, utility tokens, governance tokens
  - DAOs
  - Data Unions®
- The Data Governance Act
  - Re-use of data produced by the public sector
  - Data intermediaries
  - Sector-specific data spaces
  - Data altruism
- The emergence of data marketplaces
  - Ocean Protocols
  - Pool Foundation
  - And many others

# The big and not so big picture

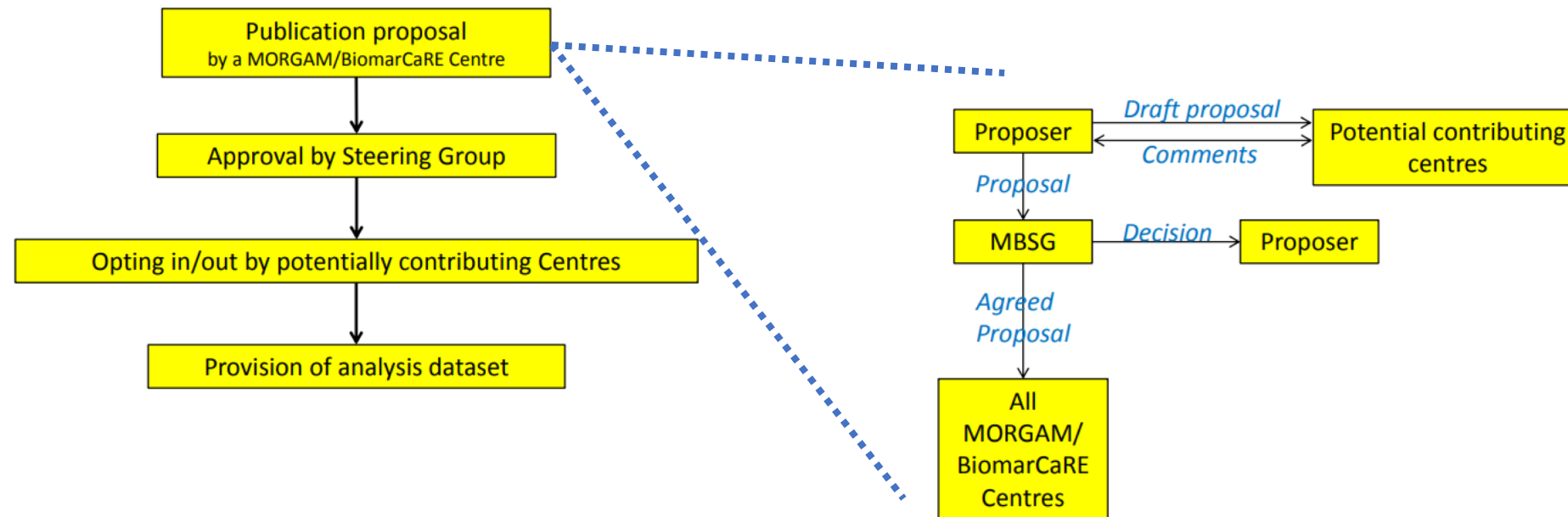


Blockchain for

1. Permissioning
2. Privacy risk control
3. Data provenance

# Permissioning

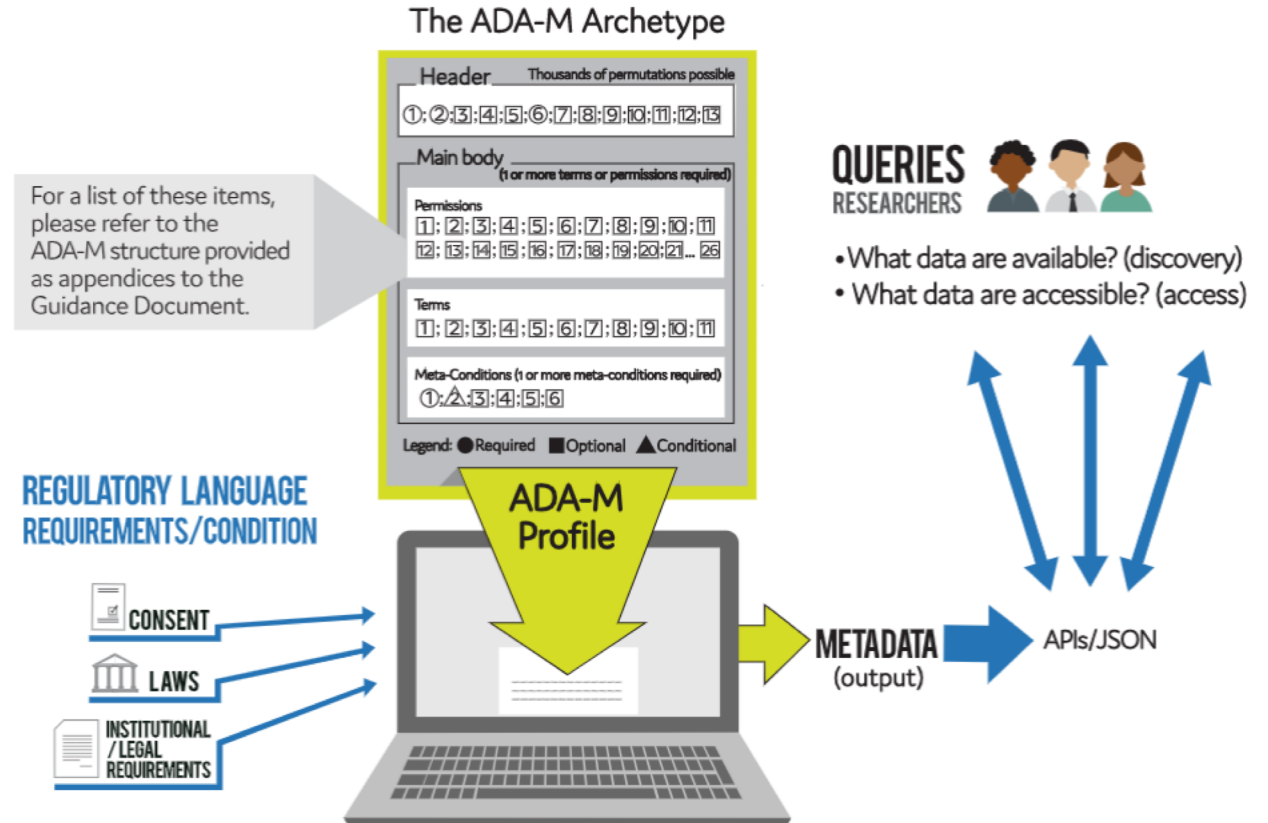
Automating access via machine-readable data use criteria



# Permissioning frameworks



**Global Alliance**  
for Genomics & Health  
Collaborate. Innovate. Accelerate.



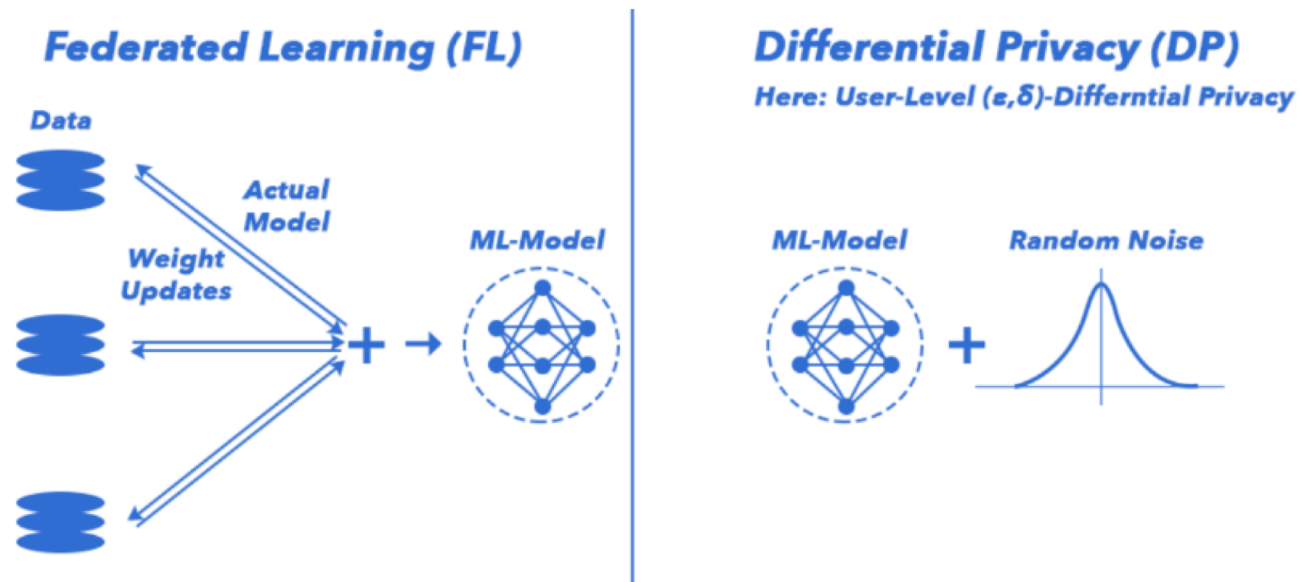
# Privacy risk control

In distributed computation systems (Federated Learning) with Differential Privacy

- Mathematically guaranteed privacy protection
- Privacy/utility threshold under data subjects/controllers' control

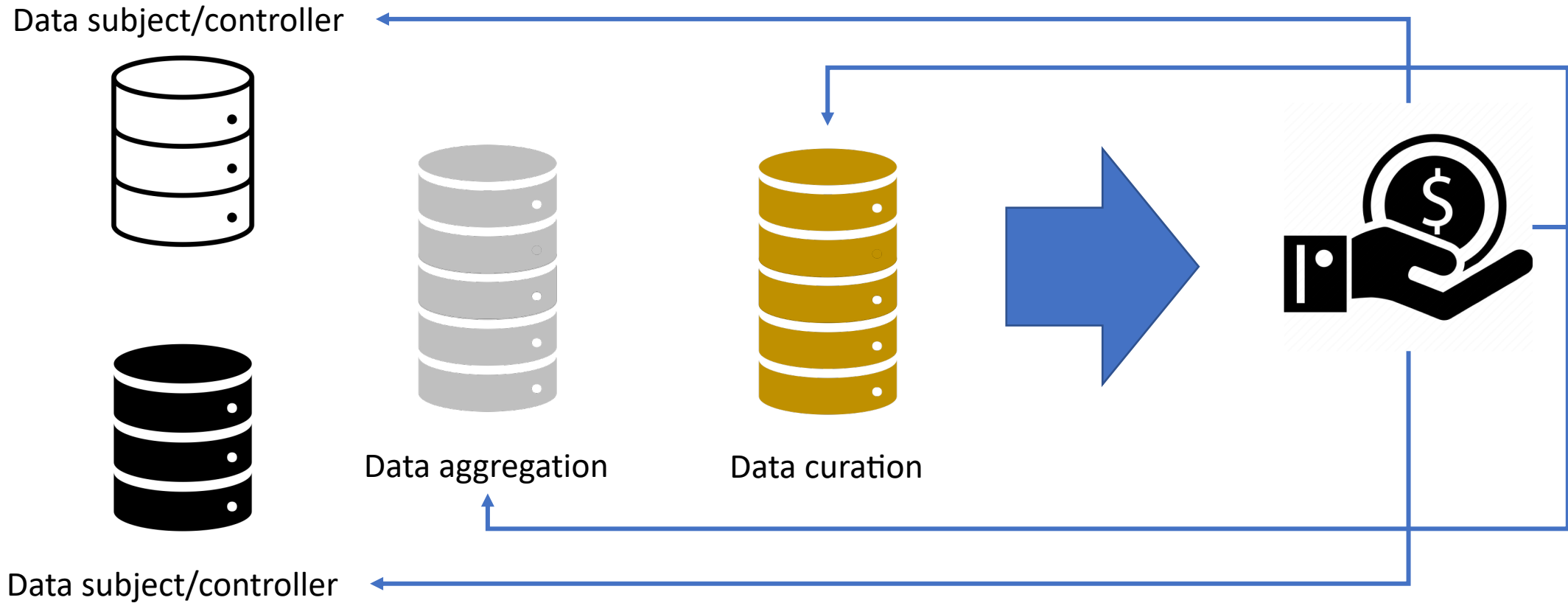
But

- What is the right budget?
- Can less privacy be bought?





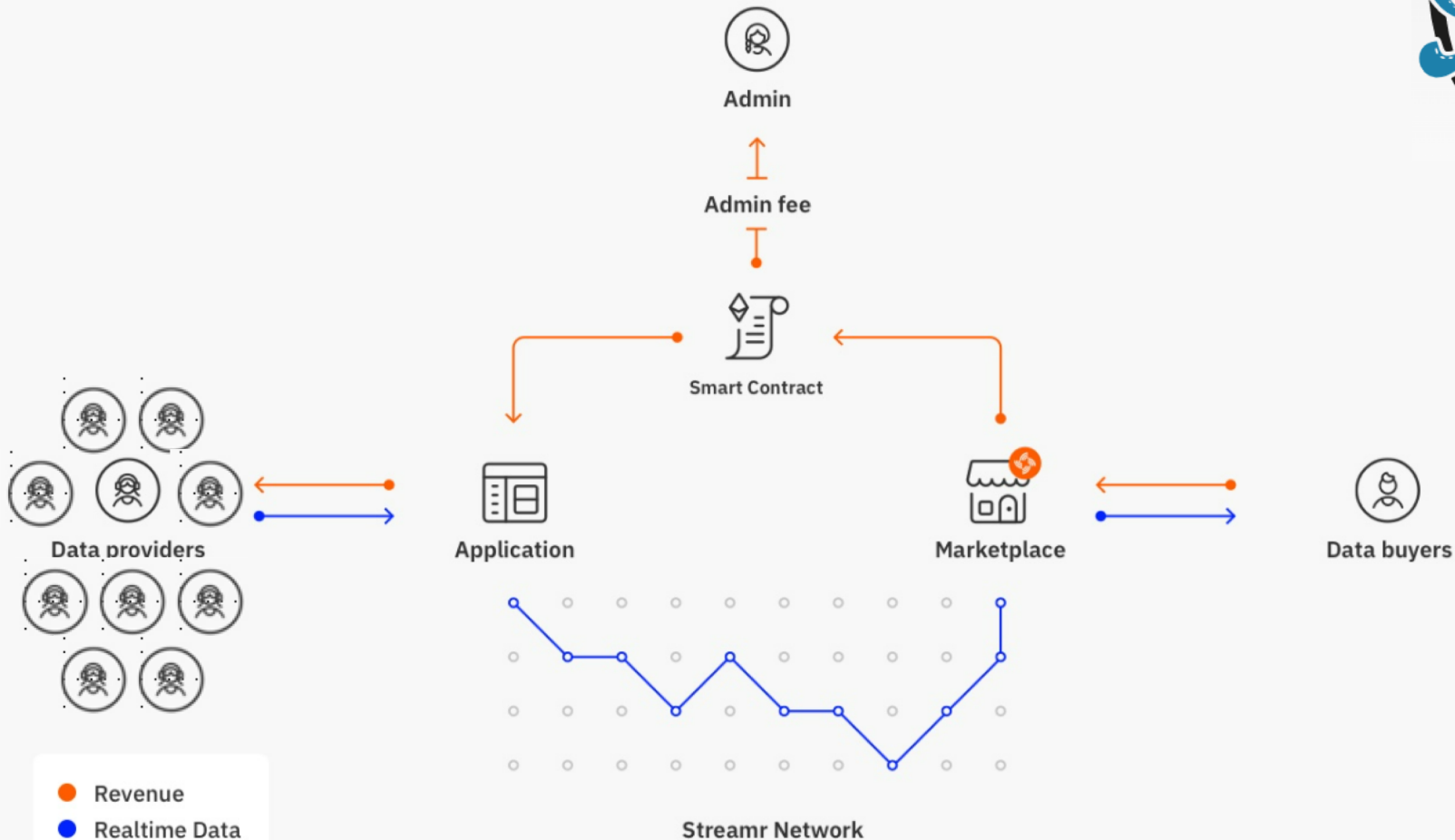
# Data provenance



# Provenance in data marketplaces



KRAKEN



# Block-chain and Value-chain

