Blockchain Meets IoT – A Research Perspective

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Blockchain Salon @ Technical University of Munich

Agenda

- ✓ **Overview of Machine Economy**

- ✓ **Blockchain Meets IoT – Research Challenges**

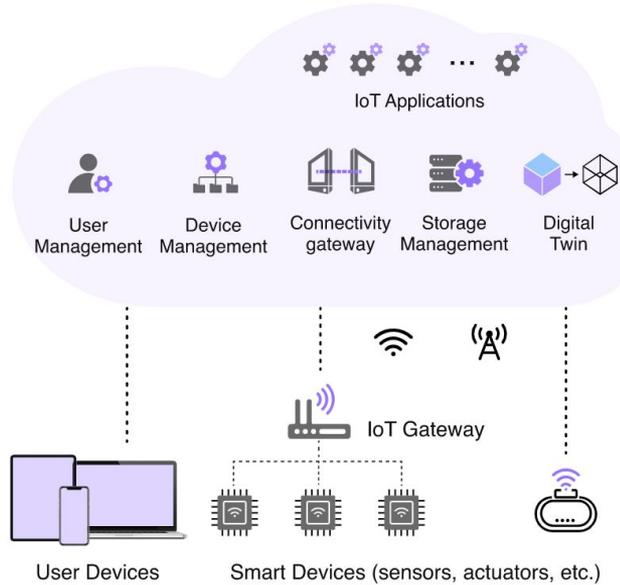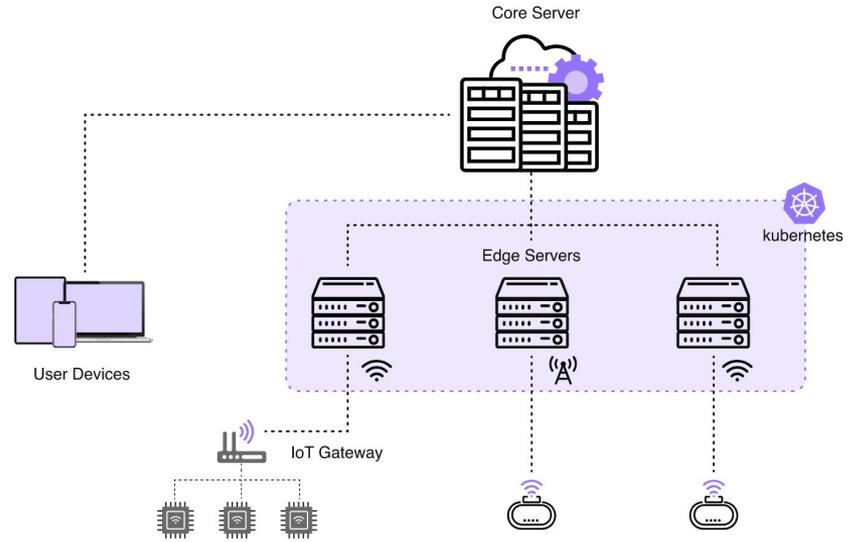- ✓ **Blockchain Meets IoT – Research Tools**

Overview of Machine Economy
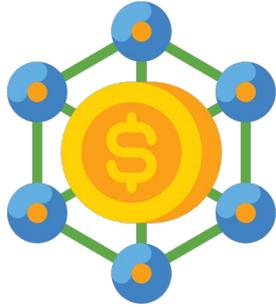
Web2-Based IoT Systems

A Cloud-Centric IoT System

An Edge-Centric IoT System

From Financial Assets to Real-World Assets

2020 – The Year of DeFi

2021 – The Year of NFT

2022+ – The Rise of MachineFi

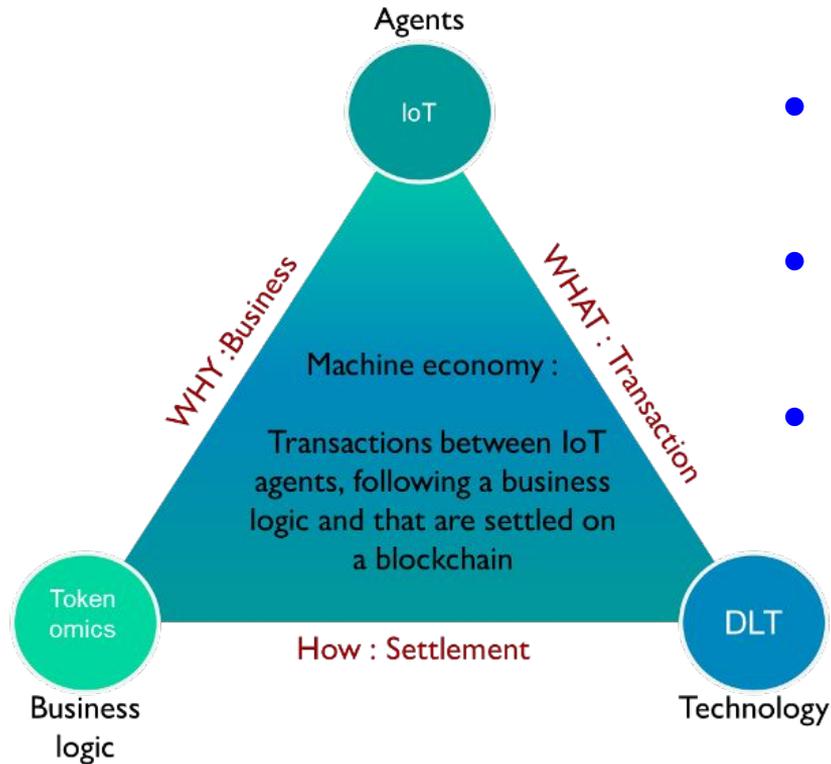**Financial Data**

Tokenized Assets

Machine Data & Utility
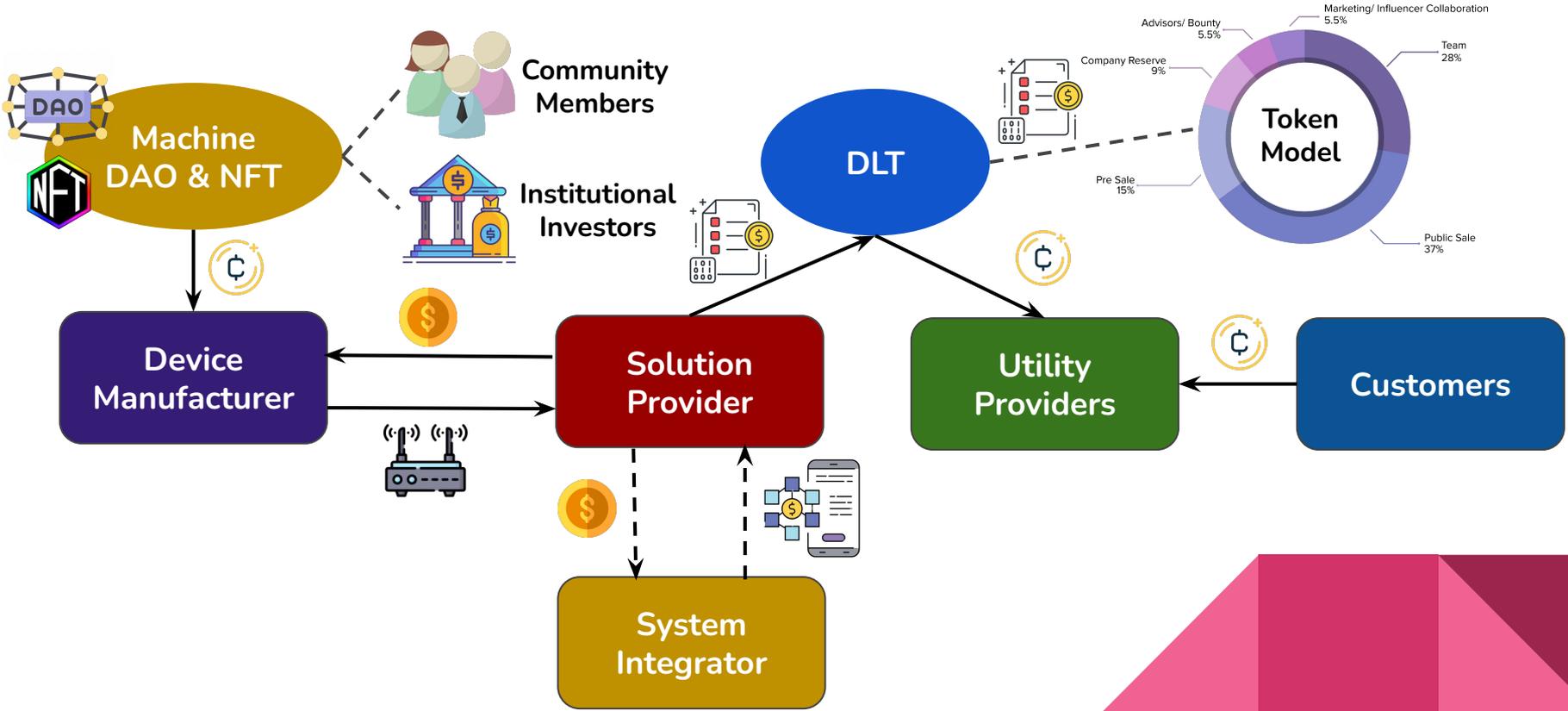
What is Machine Economy?

The machine economy is a network of smart, connected, and economically independent devices and machines acting as autonomous market participants, executing economic transactions and other activities with little to no human intervention.

2020 Report

Trends Shaping the Machine Economy

A Guide to Corporate Innovation for a New Era of Industrial Companies

NBT Next Big Thing AG · imp INNOVATIVE MANAGEMENT PARTNER
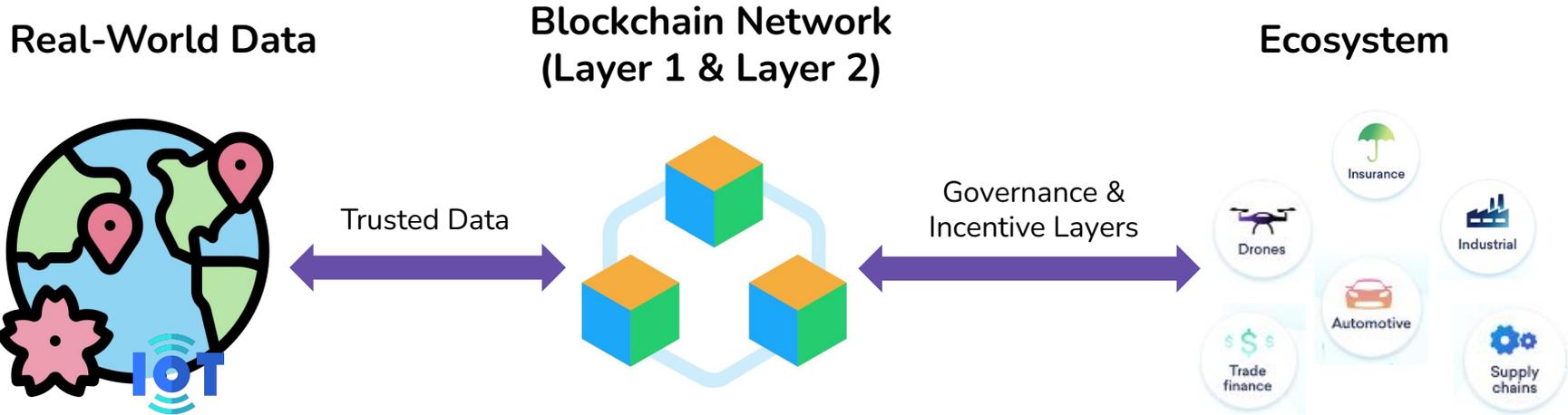
Key Enablers of Machine Economy

- **Internet of Things (IoT)**
  - Real-time information
  - Tokenized data/utility marketplace
- **Distributed Ledger Technology (DLT)**
  - Transactions without trusted intermediaries
  - Internet of value
- **Tokenomics**
  - Cold start problem
  - Long-term sustainability

New Business Models

High-Level System Architecture

Real-World Data

Blockchain Network (Layer 1 & Layer 2)

Ecosystem

Trusted Data

Governance & Incentive Layers

IoT

Insurance

Drones

Industrial

Automotive

Trade finance

Supply chains

Learn More about Machine Economy

Business Outcomes of Utilizing Innovative Technologies in Industrial IoT

Journal of Innovation

Machine Economy – The New Frontier of Digital Transformation in IoT

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Blockchain Meets IoT – Research Challenges

W3bstream – Connecting Smart Devices to Smart Contracts

Smart Devices

Real-World Data

- LOCATION
- CLIMATE
- MOTION
- LIGHT
- HEART RATE

W3bstream Applets (Business Logic)

w3bstream

Community-Driven Decentralized Network

Proofs of Real-World Activities

Machine Economy dApps

- Chains
- Dapps
- Networks
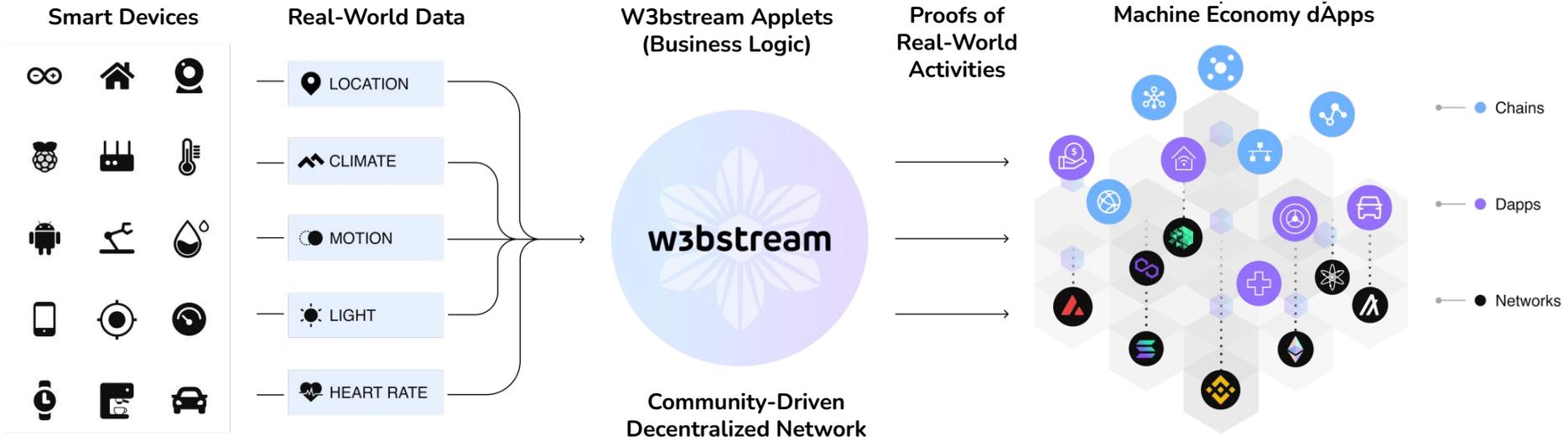
W3bstream is an off-chain compute infrastructure converting real-world data from devices into verifiable, chain agnostic, dApp-ready cryptographic proofs

Research Challenge I – Device Management
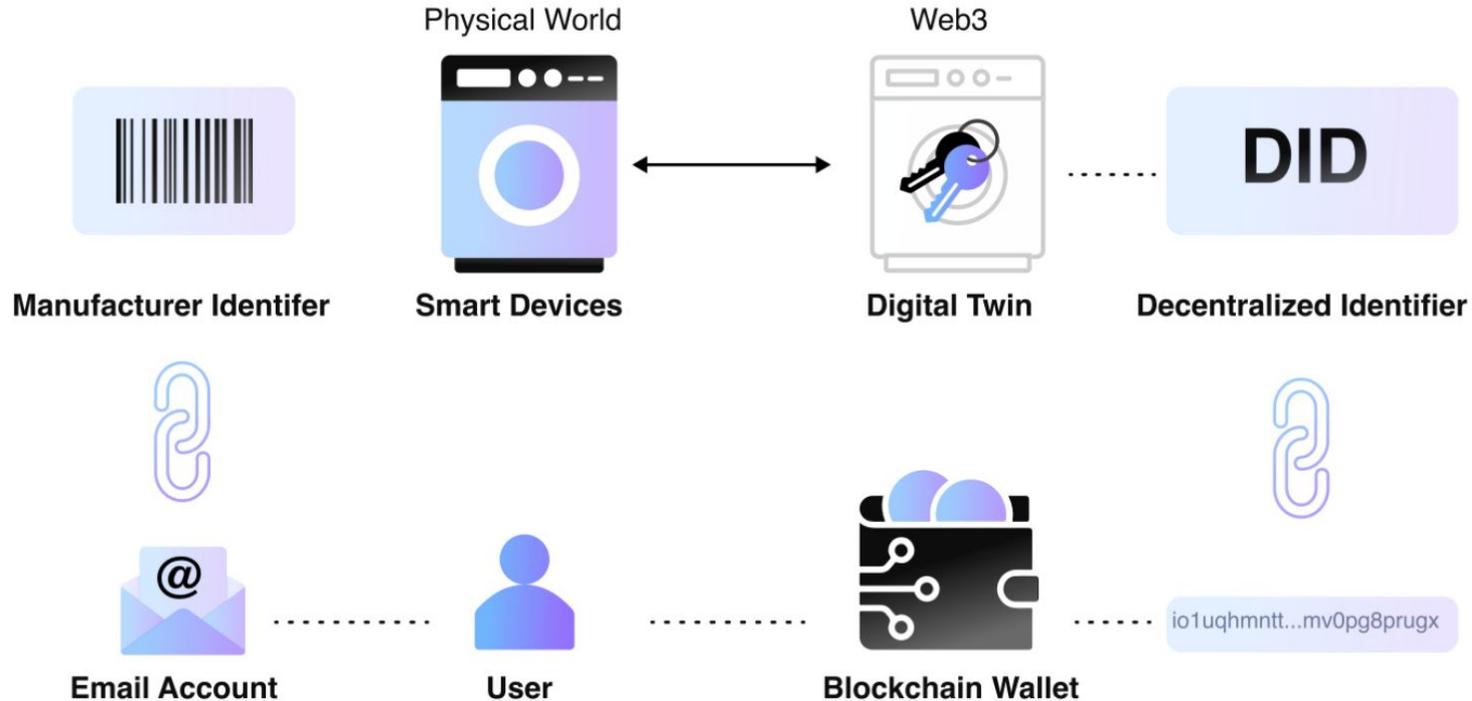
Research Challenge II – Self-Sovereign Identity for IoT

DIDComm Messageing
(HTTP, MQTT, Bluetooth, LoRa, NFC, etc.)

Identity and Credential Services

Decentralized Identifier	Verifiable Credential

Cryptographic Services

Key Management	Secure Storage	Audit Logging	Remote Attestation

Cryptographic Primitives
(TPM, PRNG, AES, Hash, RSA, ECC, KDF, etc.)

Root of Trust
(fTPM, TPM, Secure Element, Secure Enclave, etc.)
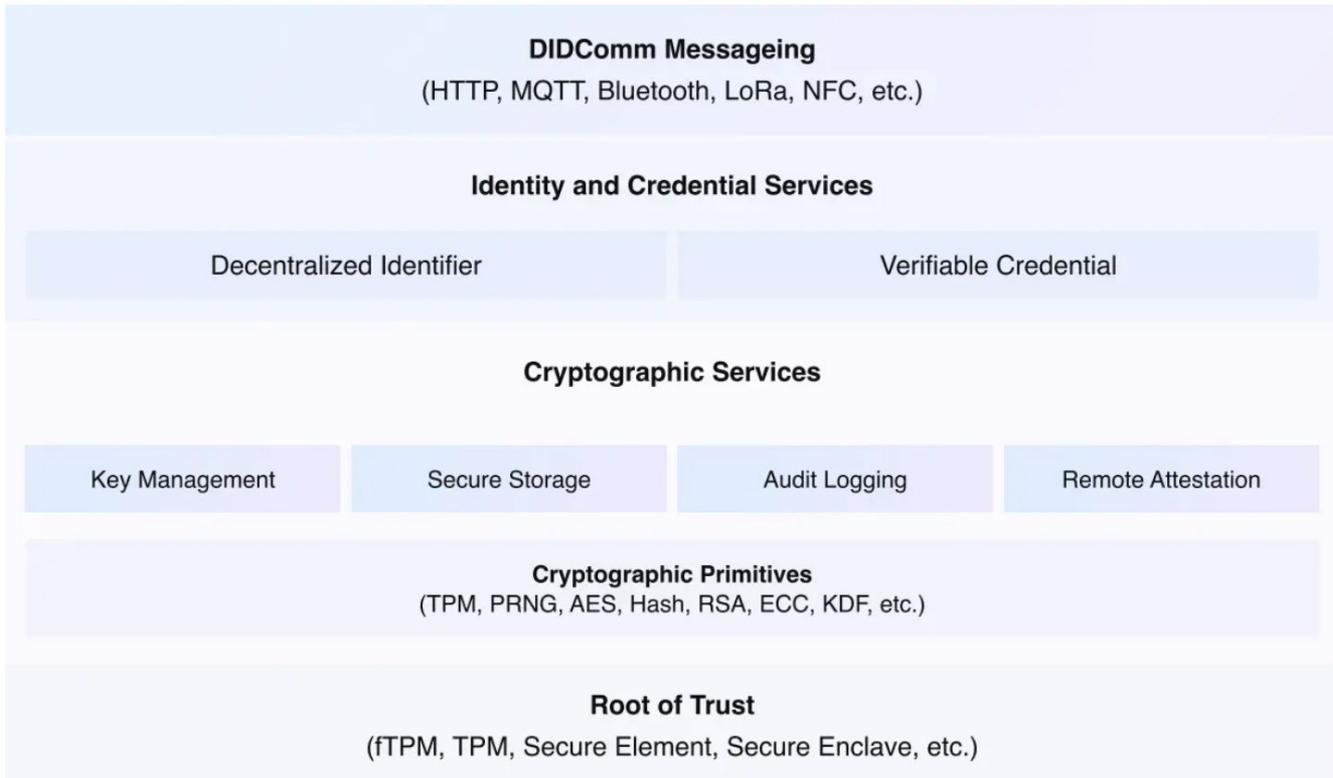
DIF W3C PSA Cryptography API arm

SDK

Research Challenge II – Off-Chain Computing
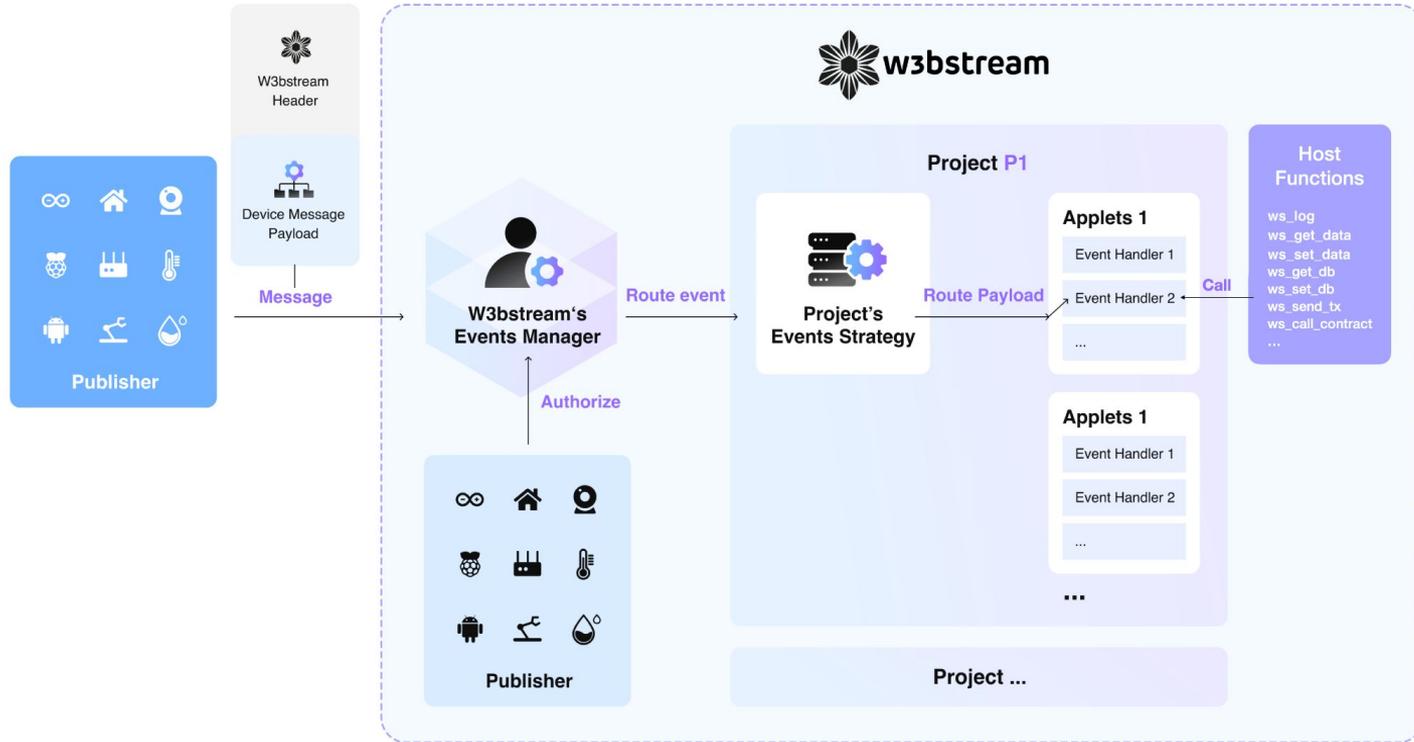
Research Challenge IV – Proof Generation
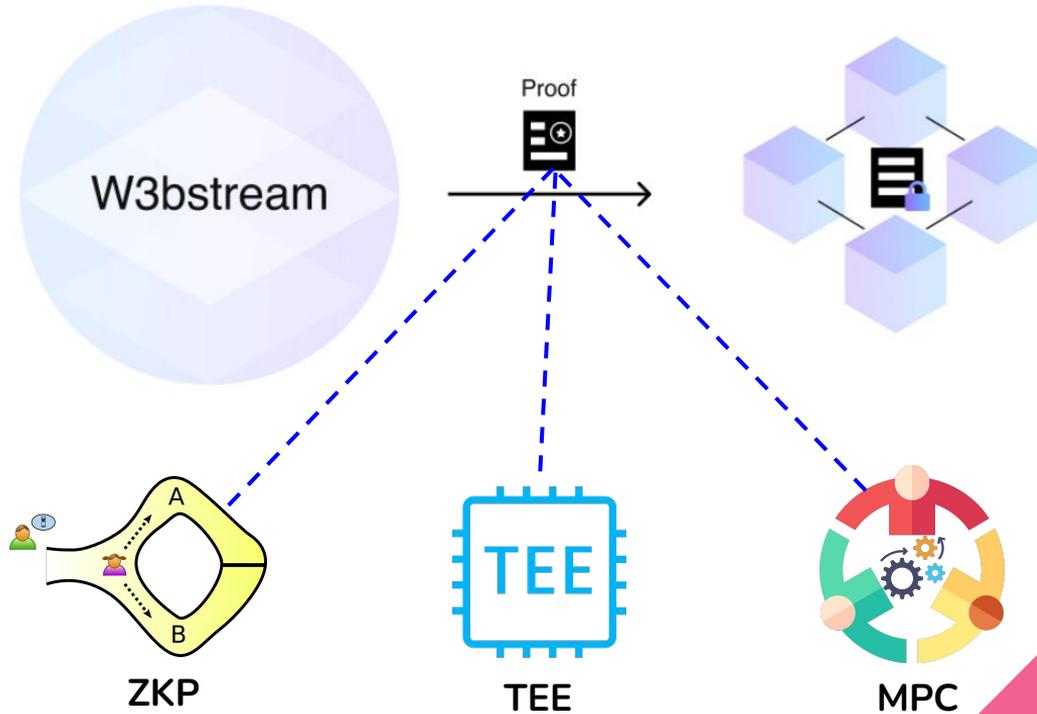
Research Challenge V – Tokenomics
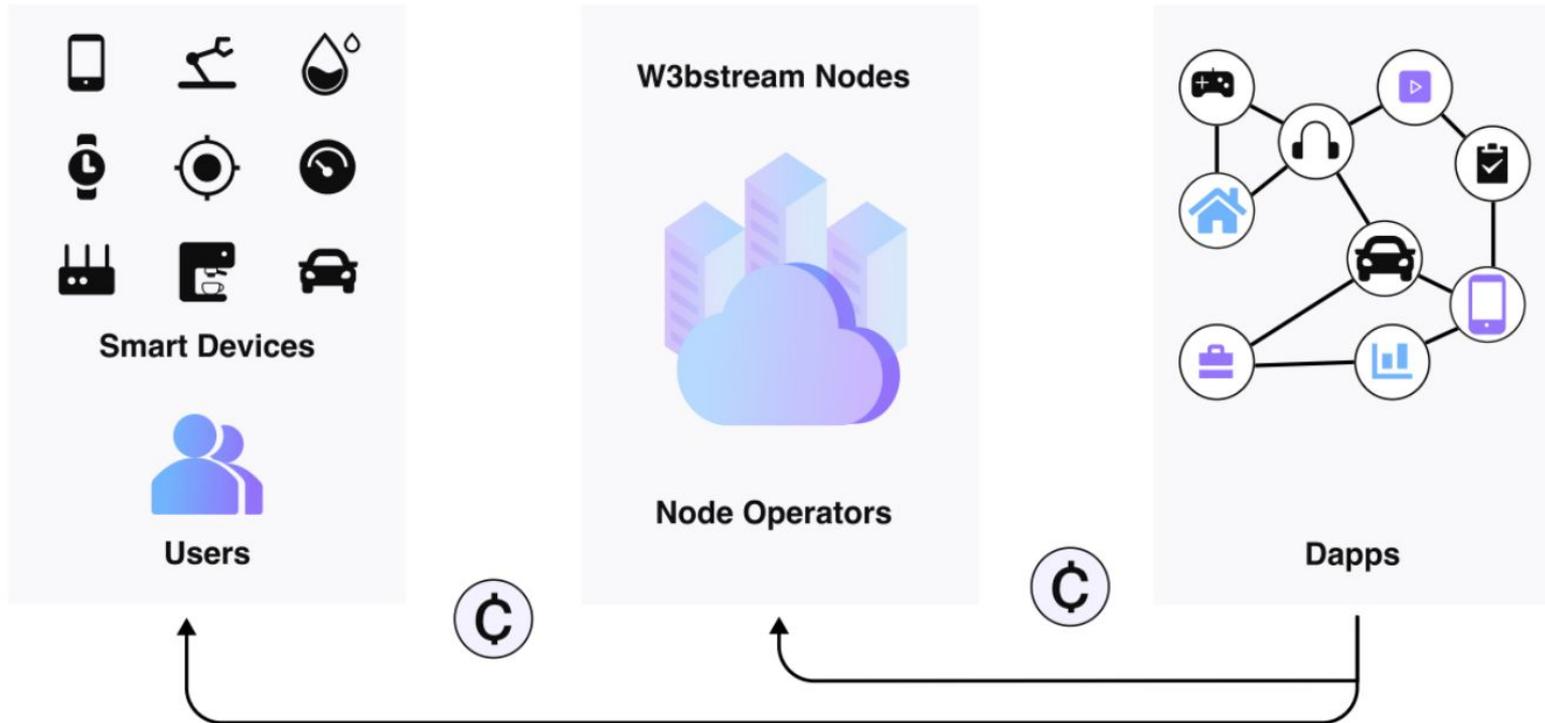
Blockchain Meets IoT – Research Tools

Open Hardware – Pebble Tracker

The IoTeX Platform

Third Party Services	Chainlink	ocean	Gnosis	Ankr	IOTEXPAD	mimo	WalletConnect

Network Tools	Wallet (ioPay)	Explorer (iotexscan)	MachineFi Device Portal	Web3-RPC (MetaMask)	Governance Forum

Layer 2 Protocols	MachineFi Device SDK	W3bstream Data Oracle	Cross-Chain Bridge (ioTube)	Decentralized Identity (DID)

Layer 1 Blockchain	EVM-Compatible (Solidity smart contracts)	Roll-DPoS Consensus	5-second Block Times	Instant Finality Transactions

IoTeX Developer Resources

https://cdn.iotex.io/machinefi/IoTeX%202.0.pdf
https://docsend.com/view/twtxhbzvisdye2xj

https://docs.iotex.io/
https://docs.w3bstream.com/

https://github.com/iotexproject/
https://github.com/machinefi/
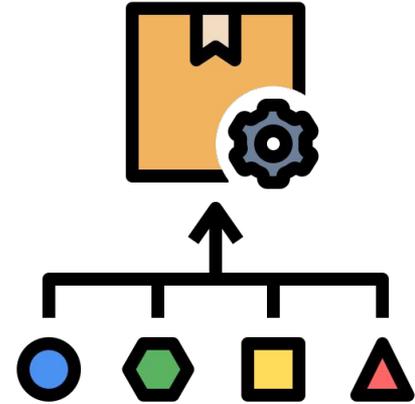
https://developers.iotex.io/

LET'S BUILD DECENTRALIZED FUTURE TOGETHER!