

# **Decentralised Autonomous Organisations & Decentralised Systems**



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MSc Emerging Digital Technologies

# About me

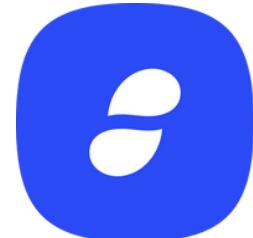
Developer Relations / Core Team



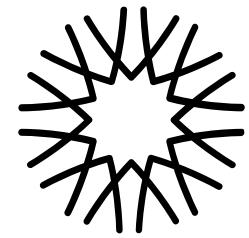
**Protocol Labs**



**WalletConnect**



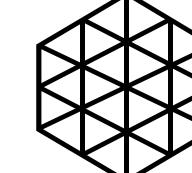
**status**



Waku



Logos



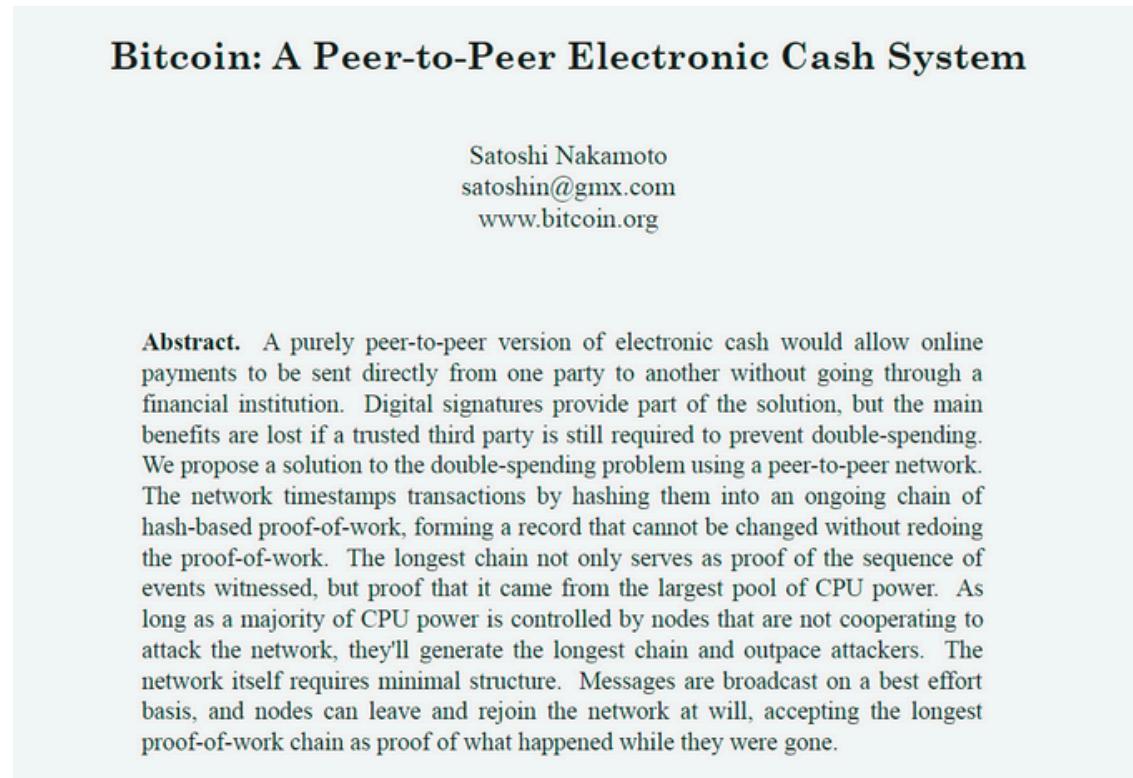
Codex

**hackyguru.com**

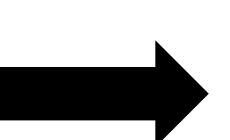
# Agenda

- 1 History & Introduction of DAOs
- 2 Paper 1  
Decentralized Autonomous Organizations: Concept, Model, and Applications
  - Crypto anarchy with decentralised governance
  - DAO Implementations and use cases
- 3 Decentralised systems
- 4 Paper 2  
Blockchain technology and modern slavery: Reducing deceptive recruitment in migrant worker populations
  - Use case : Combating deceptive recruitment in the migrant workforce
  - Limitations and practical implications
- 5 Discussion

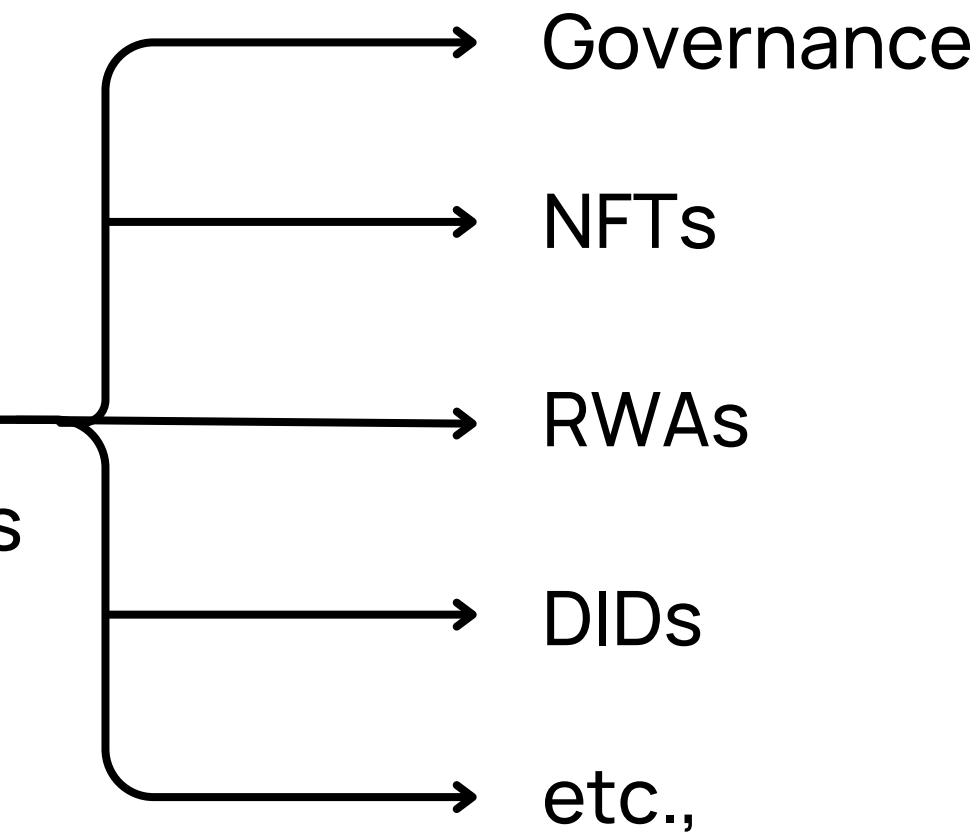
# Evolution



Decentralised cash system



Programmable  
decentralised systems



# Decentralised Autonomous Organization



# Idealogy (2014)

The screenshot shows a blog post from the Ethereum Foundation Blog. The header includes the blog's logo (a stylized diamond shape composed of red, green, blue, and yellow segments), the text "ethereum foundation blog", and navigation links for "Categories ▾", "Languages 🌐", a search bar with a magnifying glass icon, and a gear icon for settings.

## DAOs, DACs, DAs and More: An Incomplete Terminology Guide

Posted by Vitalik Buterin on May 6, 2014

Research & Development

- “DAO without internal capital is a DA and an organization without internal capital is a forum”
- DAOs == automation at the center, humans at the edges

# The first move (2015)



r/ethereum · 10 yr. ago  
Rune4444

**Introducing eDollar, the ultimate stablecoin built on Ethereum**

As someone who's been obsessed with pegged cryptocurrencies for the past 6 months, I was delighted to find out that even with just my meager programming skills, developing for Ethereum is so incredibly easy that I've been able to come up with what I believe is close to being the perfect design for a stable cryptocurrency.

In short, the eDollar is a token pegged to the USD that is issued in a manner similar to bitUSD, and that has a DAO (called Maker) backing it and providing liquidity similar to the system of liquidity providing custodians that NuBits uses.

The purpose of eDollar is to give average people a currency they can use on the ethereum network to interact with dapps, without having to worry about insane volatility like with bitcoin and other 1st gen cryptocurrencies. It also gives ethereum investors the possibility to take leveraged ETH positions (albeit with very high collateral requirements).

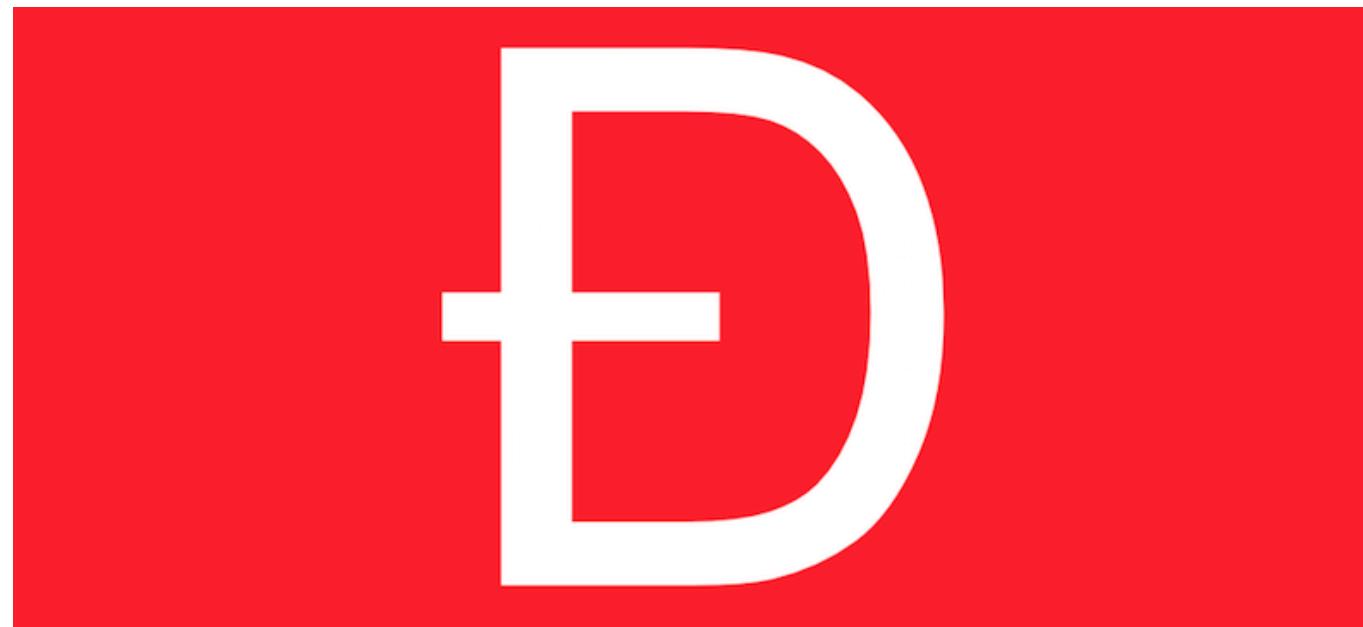
To see a full (but rough) description of the features of the eDollar design, you can check out this post on the Maker forum: <http://makerdao.com/index.php?topic=4.0> (the forum design is really fancy, I know :p)

To see the eDollar contract with comments, check: <http://makerdao.com/peggedCoinRemake.sol>



- Rune Christensen proposed a DAO that acts as a constitution for guaranteeing the slowness and demand of feature changes
- 8 years later, MakerDAO and \$DAI are still active

# The DAO (2016)



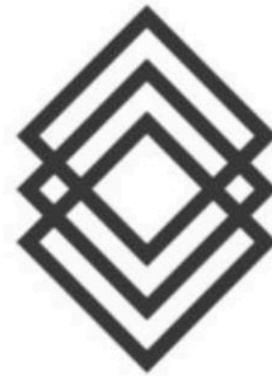
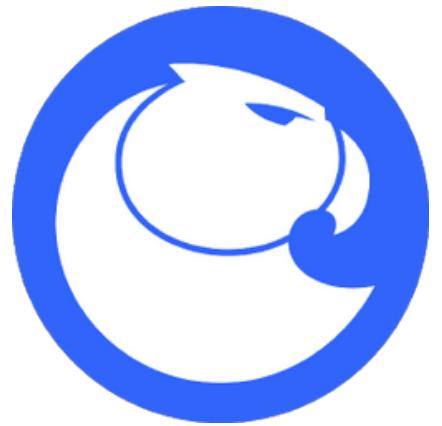
- Token sale in April 2016
- One of the largest crowdfunding campaigns in history
- Hacked ~6B in June 2016 - resulting in Ethereum (hard fork) & Ethereum classic

# Slow transition(2016-22)

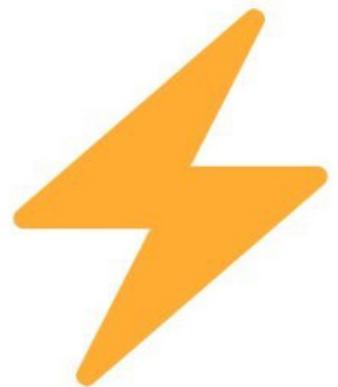


- Funding public goods and projects supporting Ethereum infrastructure
- DeFi projects adopting DAO structures to increase level of decentralisation

# DAO Tooling (2021-...)

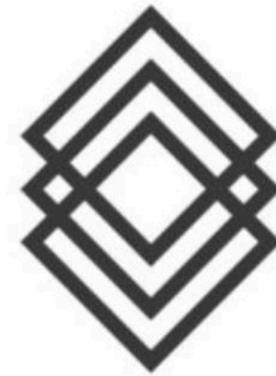
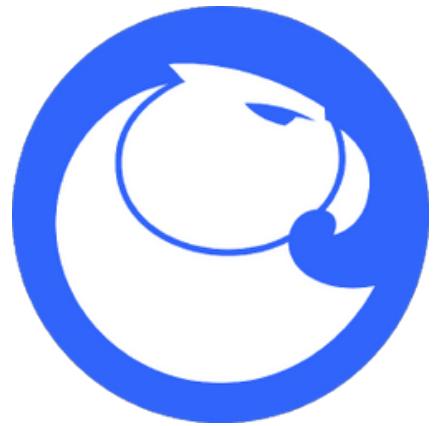


DAOstack



- To boost adoption & attract more voters, off-chain governance architectures were introduced to cut down on gas fee
- Better awareness about quadratic voting

# DAO Tooling (2021-...)



DAOstack



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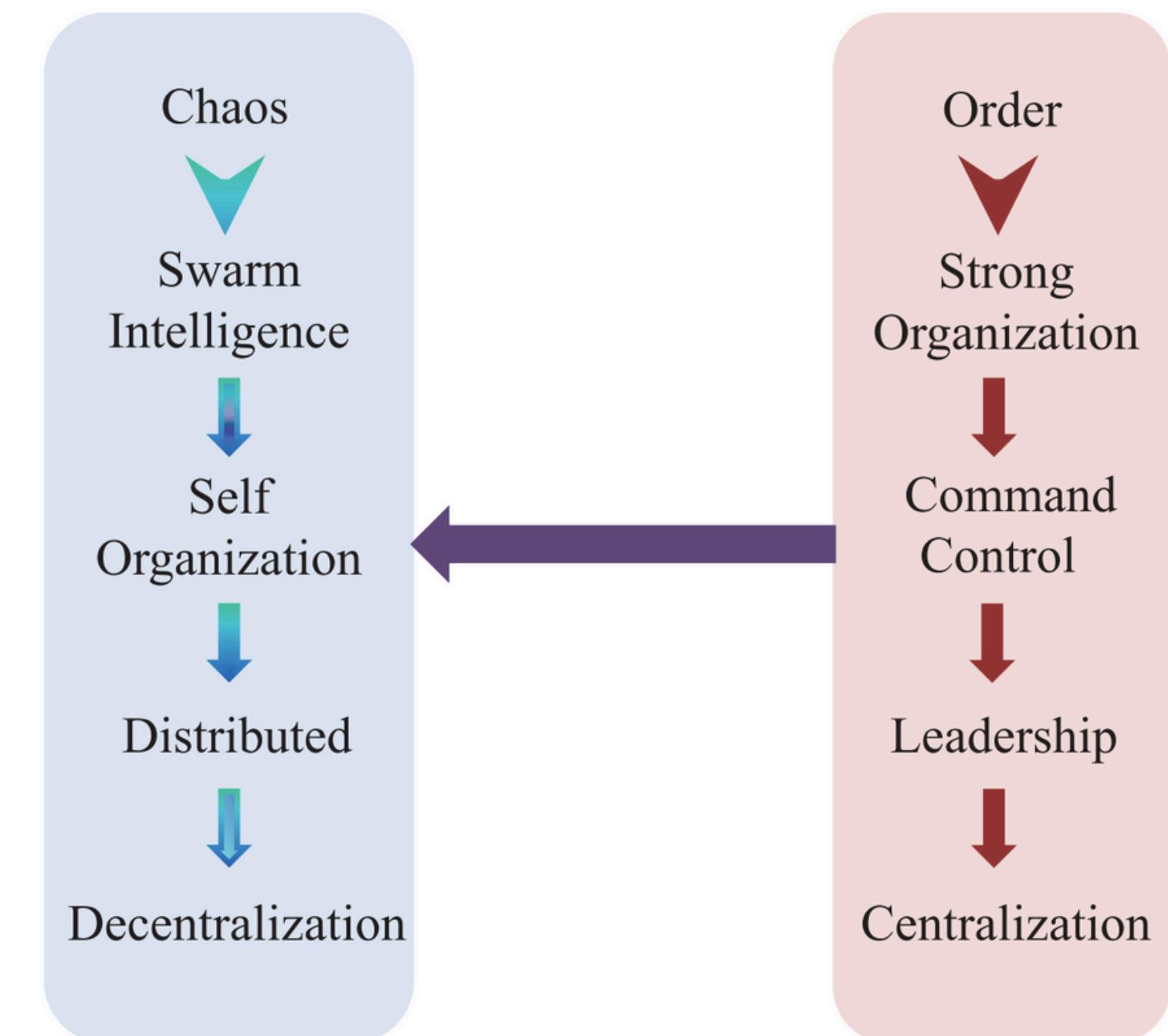
# Decentralized Autonomous Organizations: Concept, Model, and Applications

Shuai Wang<sup>id</sup>, Wenwen Ding, Juanjuan Li<sup>id</sup>, *Member, IEEE*, Yong Yuan<sup>id</sup>, *Senior Member, IEEE*,  
Liwei Ouyang<sup>id</sup>, and Fei-Yue Wang<sup>id</sup>, *Fellow, IEEE*

In a nutshell :

- Centralised vs Decentralised
- Ethological requirements
- Reference model for DAOs
- DAO Implementations (Specifically Aragon)
- Challenges and future trends

# Centralised vs Decentralised



# Ethological requirements

Outlined characteristics :

- Distributed and Decentralized
- Autonomous and Automated
- Organized and Ordered

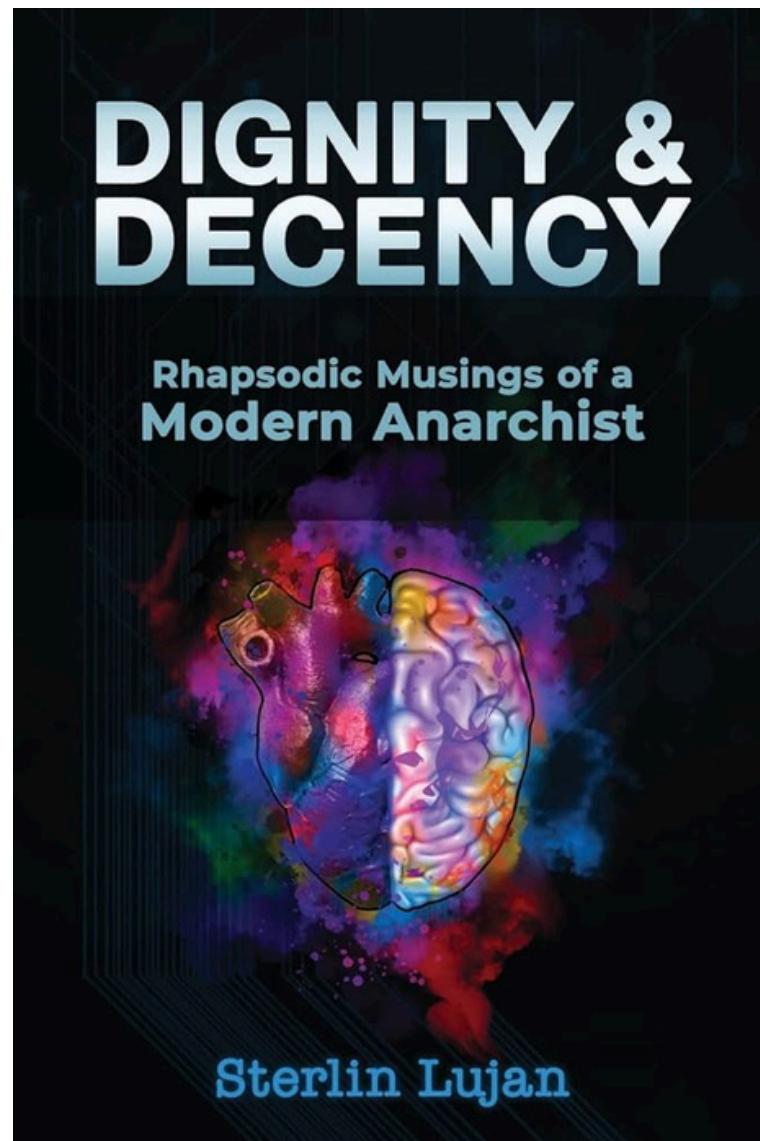
# Ethological inferences

(Note : personal opinions, this is not a part of the referenced paper)

- DAOs digitally transform governance from hierarchy to anarchy.
- Community and token holders can get involved in decision-making based on their unbiased quadratic power
- The DAO framework should not compromise on level of decentralisation for ease

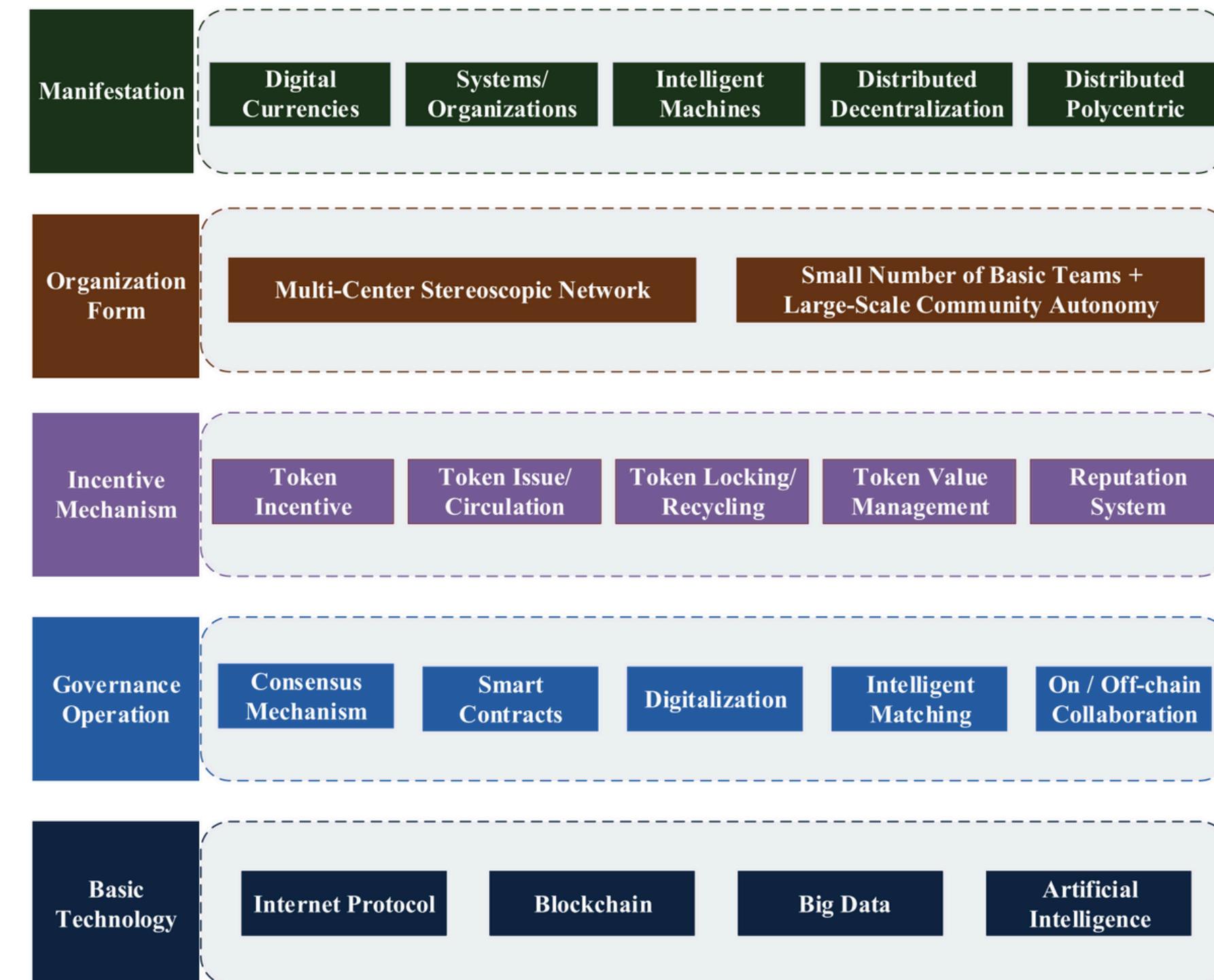
# Ethological inferences

(Note : personal opinions, this is not a part of the referenced paper)

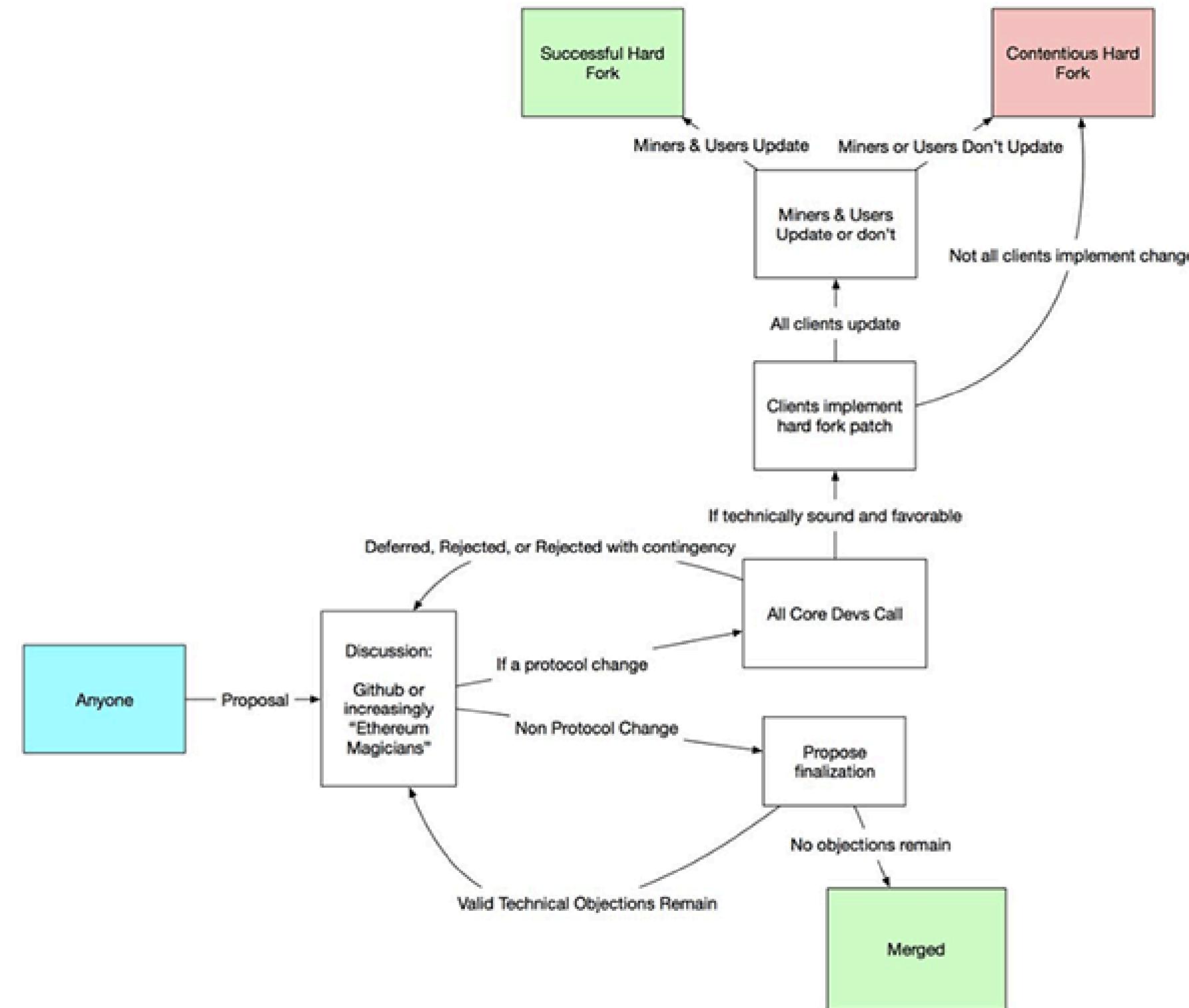


- Book recommendation to understand the need for DAOs : 'Dignity & Decency' by Sterlin Lujan
- Motive of Bitcoin was to change the financial system from a trust based hierarchy (banks) into a permissionless anarchy. DAOs share the same values for governance.

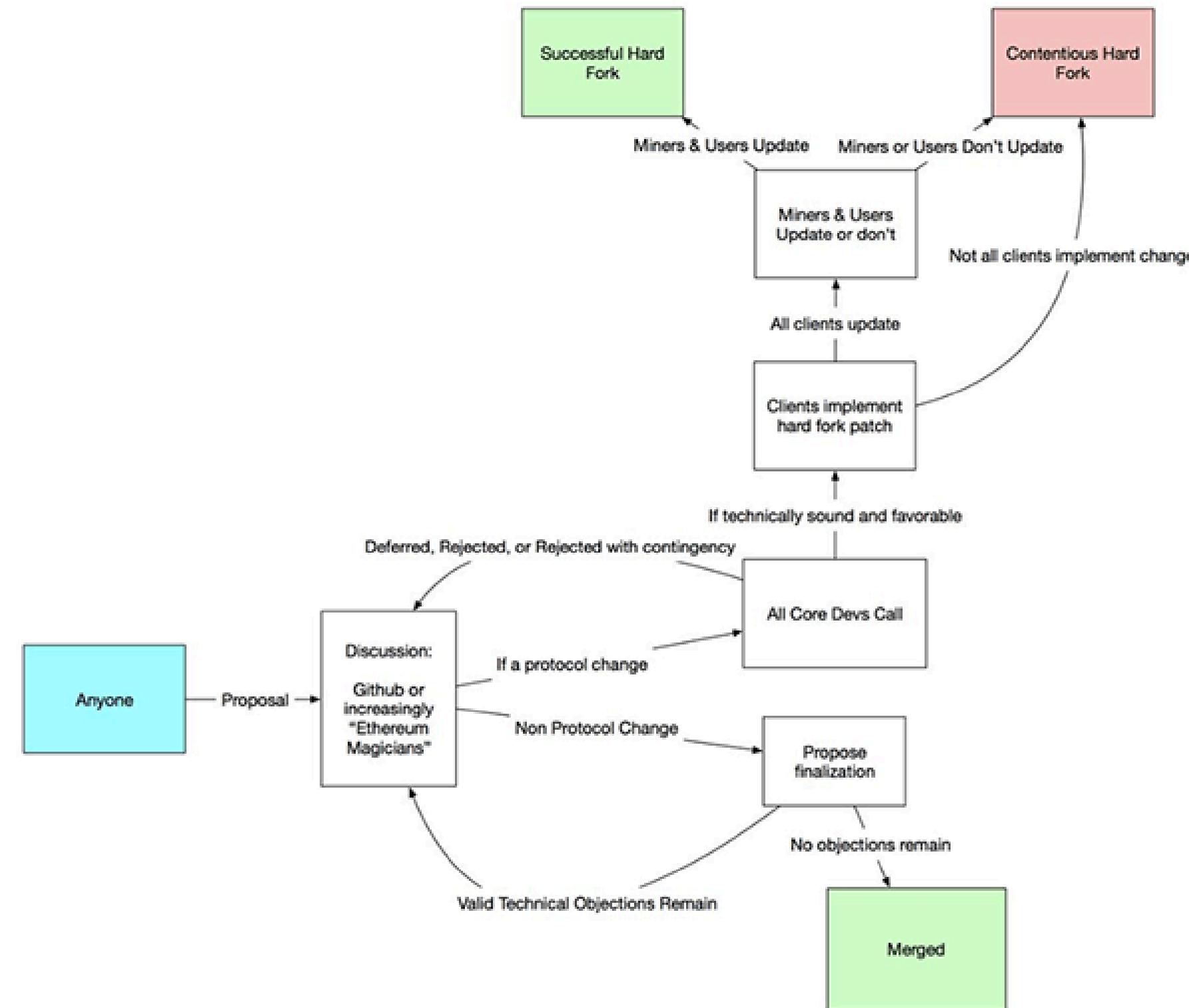
# Reference model for DAOs



# Etheruem Governance Model



# Etheruem Governance Model



# EIPs

Standards Track: ERC

## ERC-1328: WalletConnect URI Format 💬 ↔

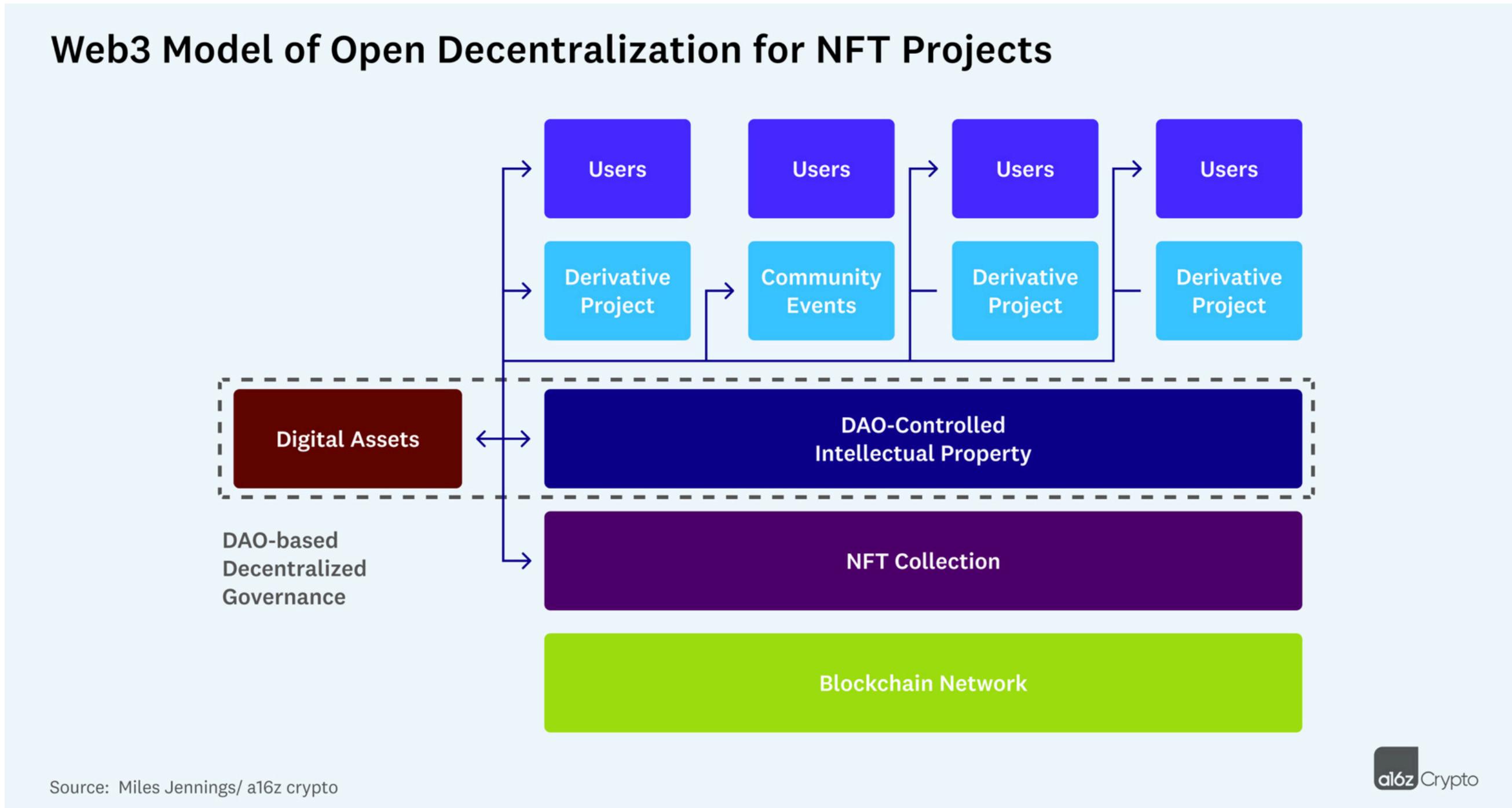
Define URI format for initiating connections between applications and wallets

Authors ligi (@ligi), Pedro Gomes (@pedroud)

Created 2018-08-15



# NFT Based Governance Model



# Challenges and future trends

## 1. Security issues

- No ways to retrospectively upgrade contracts to fix security flaws
- Negative reputation due to multiple rugpulls and hacks

## 2. Unclear legal status

- Different geographical regulations
- Questions in terms of liabilities, ownership and other legal concerns

## 3. Technical limitations

- Huge semantic gap between legal rules (wet code) and rules written in smart contracts (dry code)
- Lots of unexplored edge cases and lack of standardised tooling

# Use cases for DAOs

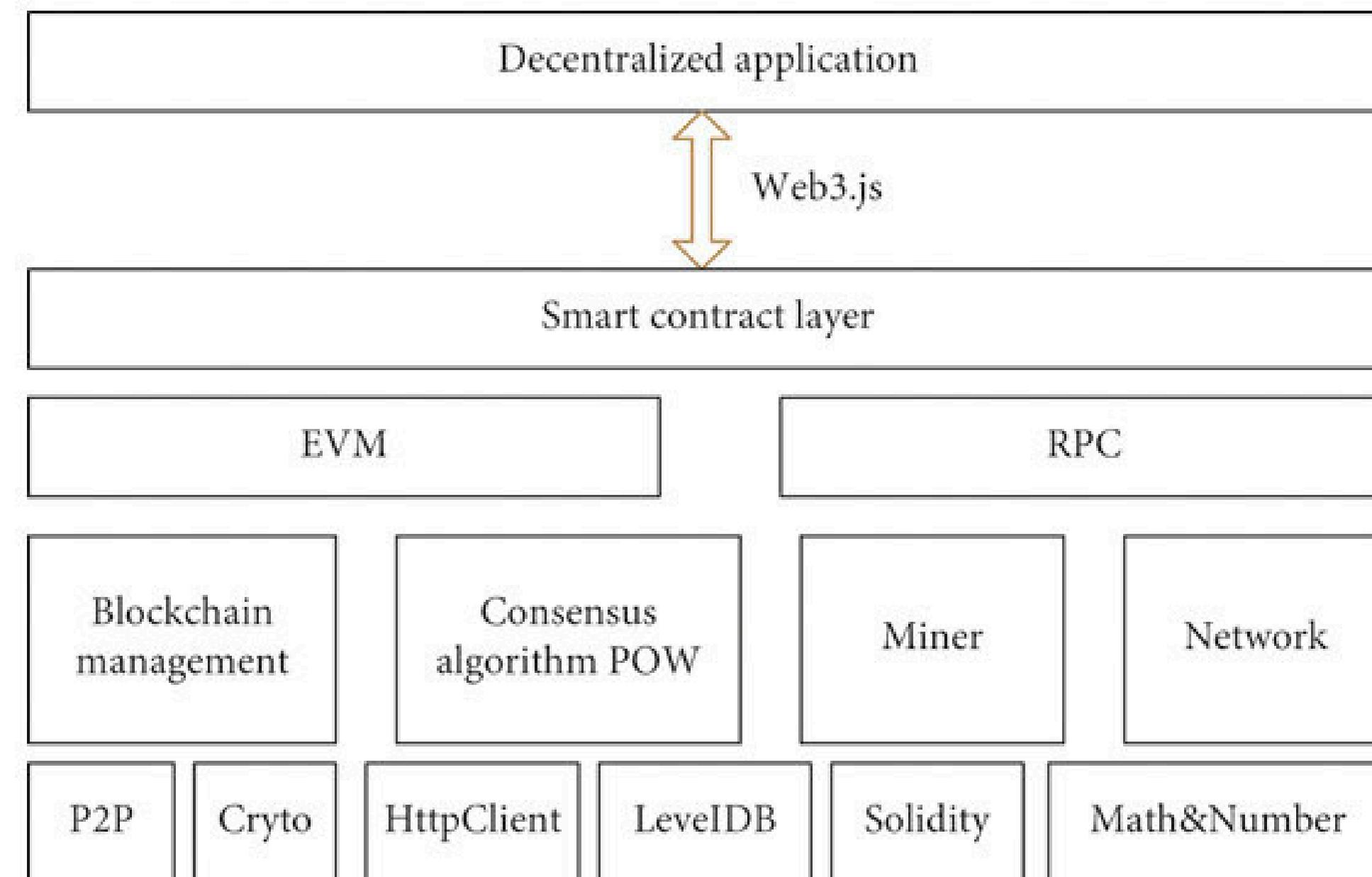
- Public goods funding
- Decentralised dispute resolution
- Decentralised application governance
- NGOs and public trusts
- Local communities
- Peer grading and reputation systems
- Data governance
- Quality control and assurance
- KYC Verification
- Incentivised developer Q&A forums
- University societies
- Network states

# Decentralised systems

- DAOs are just one single application of decentralised systems
- There are wider use cases that can be powered by decentralised systems. Some of the examples are :
  - Decentralised applications (Dapps)
  - Decentralised infrastructure
  - Blockchains
  - Network states etc.,

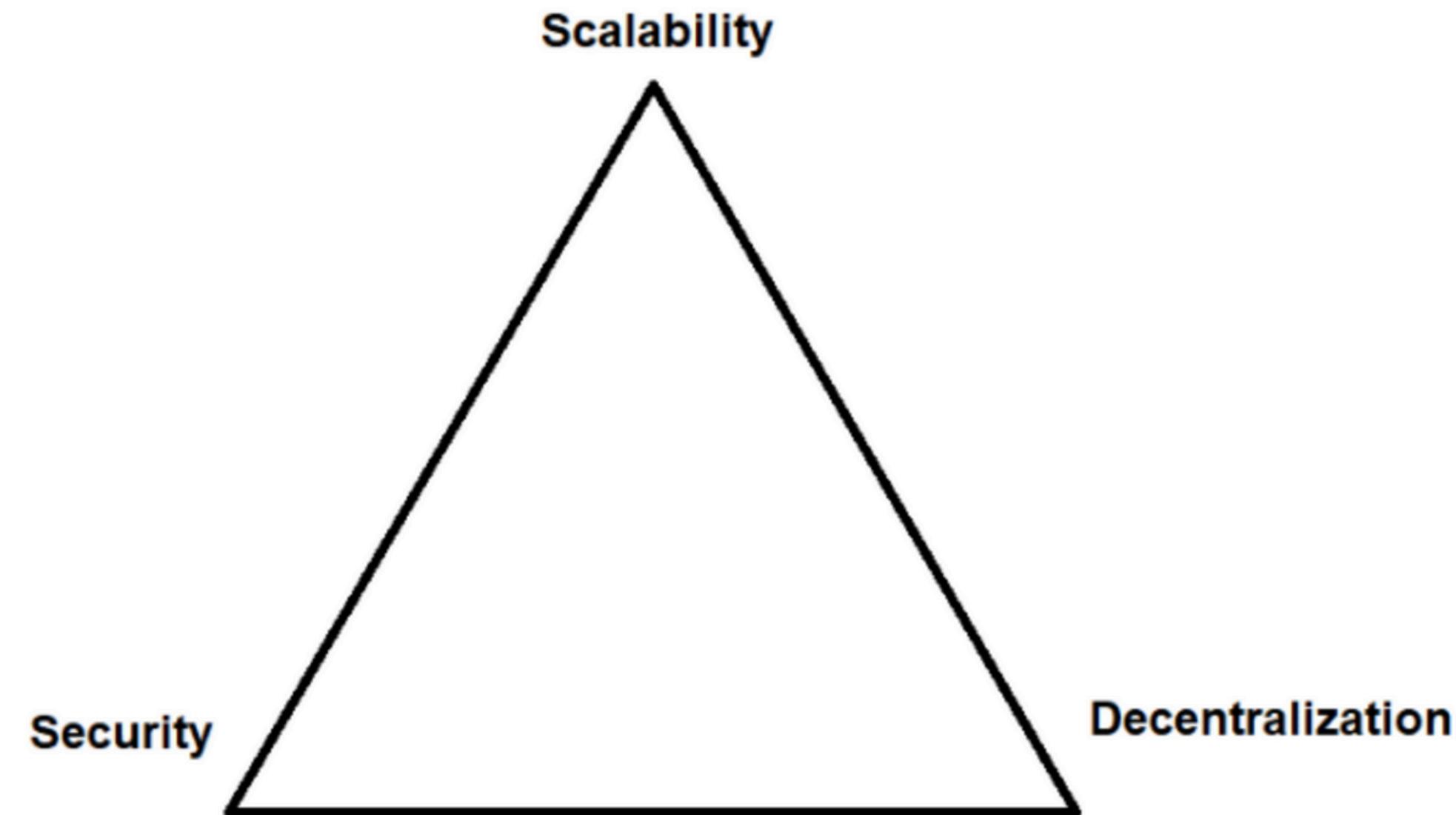
# Decentralised systems

How majority of developers build dapps using Ethereum :



# Decentralised systems

Blockchain Trilemma



# Broader decentralised systems

Some components that power decentralised systems :

## Networking

- pubsub / gossip sub (devp2p/libp2p)
- node discovery (discv5)

## Cryptography

- Elliptic curve operations (crypto/secp256k1)
- Core cryptographic functions (golang.org/x/crypto)
- bn256 - Pairing-based cryptography

## Database

- leveldb - Primary data storage

## Misc

- Data serialization (protobuf)
- [github.com/gorilla/websocket](https://github.com/gorilla/websocket)
- [github.com/ethereum/go-ethereum/rpc](https://github.com/ethereum/go-ethereum/rpc)

# Blockchain technology and modern slavery: Reducing deceptive recruitment in migrant worker populations

Katherine L Christ<sup>\*</sup>, Christine V Helliar

*University of South Australia Business, GPO Box 2471, Adelaide, SA 5001, Australia*

In a nutshell :

- Highlighting particular use case : deceptive recruitment & modern slavery
- Stages of migrant recruitment and issues involved
- Using blockchain to combat against illegal labor immigration
- Limitations

# Stages involved

Stage	Issues involved	References
Initial contact with recruiter/ employer	Recruitment Type of work and industry Conditions Country of work including pay, hours and overtime Fees Contract may be withheld from worker after being signed	LeBaron (2014); Stringer et al. (2016); Barrientos (2013); Marschke and Vandergeest (2016); Chantavanich, Laodumrongchai, and Stringer (2016); Farbenblum and Nolan (2017); Nolan and Bott (2018)
Process of migration	Passport needed Visa needed – should be consistent with contract Location should be consistent with agreed conditions and not changed retrospectively Transport as agreed	Farbenblum and Nolan (2017); LeBaron et al. (2018); Nolan and Bott (2018)
Arrival	Conditions not consistent with contract Contract changed retrospectively Location changes Type of work and industry changes	Pierce (2011); Mak, Abramsky, Sijapati, Kiss, and Zimmerman (2017); Wilkens (2018); Morgan and Olsen (2015); LeBaron (2014); David (2010)
Actual work	Pay less than agreed Documents confiscated Overtime and hours of work change Visa conditions change Fee deductions taken from pay inconsistent with original contract	Russell, Lee, and Clift (2018); Benstead et al. (in press); Pierce (2011); Morgan and Olsen (2015); LeBaron (2014); Mak et al. (2017); David (2010); LeBaron et al. (2018)
Ability to leave	Travel documents confiscated	LeBaron et al. (2018); Mak et al. (2017); Miller (2017); Wilkens (2018); Stringer et al. (2016)

# Modern slavery

## Modern slavery

- Illegal and illegitimate
- Includes traditional slavery, forced or compulsory labour, bonded labour, the worst forms of child labour, sexual servitude, domestic servitude, organ trafficking, orphan trafficking and human trafficking

## Poor work conditions (grey area)

- May be legal or illegal, often considered unethical
- May include unsafe work conditions, poor pay, entitlements not being provided, etc.

## Legal and appropriate work conditions

- Legal and legitimate
- All relevant laws and regulations complied with

# Centralised solutions

- International Recruitment Integrity System (IRIS) is an initiative supported by the International Organization for Migration (IOM) that has published its Standard for ethical migrant recruitment
- In 2013, Bangladesh announced biometric 'smart cards' . The purpose was that Bangladeshi embassies operating in foreign countries could quickly identify the worker without needing to access to their passport

# Rise of decentralised solutions

- Diginex and Mekong Club to pilot anti-slavery blockchain project for Thai migrant workers
- Not only protects workers from exploitation but also gives large retailers and manufacturers the peace of mind that they are complying with the many global regulations
- Currently, there are 40 million people trapped in modern slavery and only 0.2% of these are helped

Can blockchain break shackles of 40 million people caught in modern slavery?

Diginex works with governments and NGOs on blockchain-enabled systems to ensure contract details and workers' whereabouts are clearly recorded

Pilot project aims to help at-risk migrant workers in garment industry unable to access employment contracts, leading to lower pay and longer hours

In Partnership With IDCM

Reading Time: 4 minutes

Why you can trust SCMP 



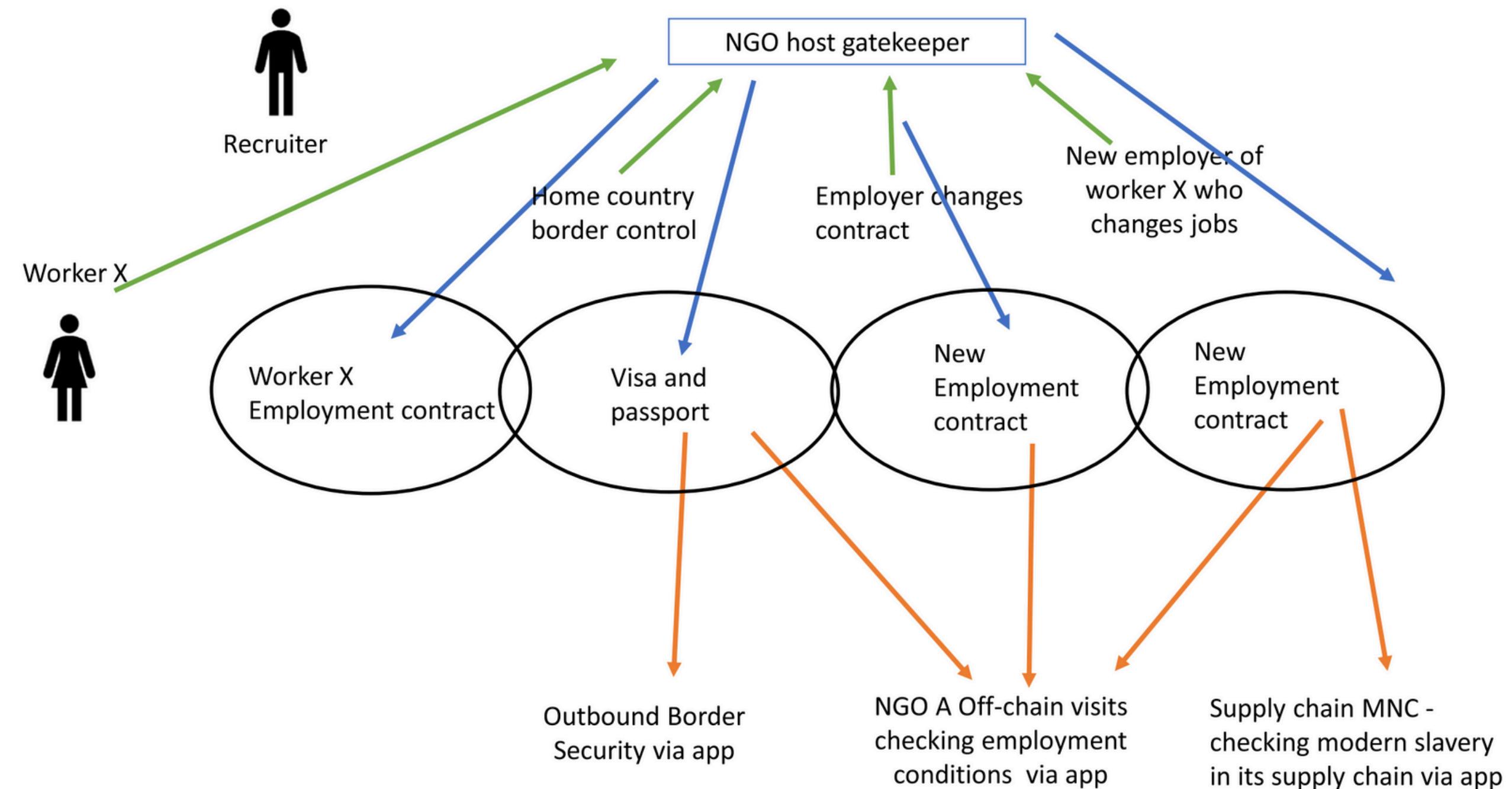
# Global distribution

	Rank	Prevalence Rate*	# of People
North Korea	1	104.6	2,696,000
Eritrea	2	90.3	320,000
Mauritania	3	32.0	149,000
Saudi Arabia	4	21.3	740,000
Türkiye	5	15.6	1,320,000
Tajikistan	6	14.0	133,000
United Arab Emirates	7	13.4	132,000
Russia	8	13.0	1,899,000
Afghanistan	9	13.0	505,000
Kuwait	10	13.0	55,000

\*Estimated number of people in modern slavery per 1,000 population

Source : WalkFree

# Process



# Limitations

- As with many illegal activities workers who knowingly enter illegal work arrangements are unlikely to engage with tools designed to protect them; their activities would essentially remain 'off chain'.
- Tooling for immigration is different in every country and there is a clear lack of composability
- A huge majority of the exploited individuals do not have access to digital space

# Group Discussion

Some optional pointers :

- What are the low-hanging fruits for converting a traditional organisation setup into a DAO?
- Do DAOs require a new governance token or is it ok to adopt to an existing token?
- How can DAOs fit into a country's regulatory framework?
- How important is user anonymity in DAOs?
- Can DAOs conceptually evolve into a broader topic?
- What are some of your favourite DAOs and what are the utilities?

# Group Discussion

Some optional pointers :

- What is the current state of decentralised systems?
  - Explorations in scaling?
  - Barriers in user adoption?
  - Blockchain vs Web3?
  - Architectural standards?
- How can blockchain solve problems in 'modern slavery'
  - ZK
  - TEEs
  - DIDs

# Thank you!



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