Stablecoins and Payments

Introduction to Celo and Mobile-based Blockchain Payments

celo

UC Davis ECS 189F Course

Yaz Khoury

Developer Relations

Conducts Technological Symphonies

Interest, Hobbies
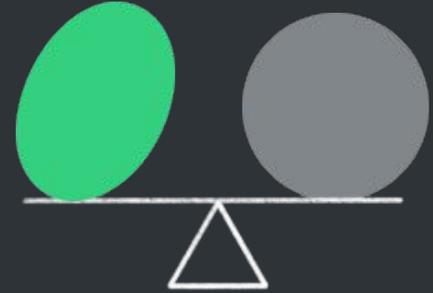
- Mediterranean culture

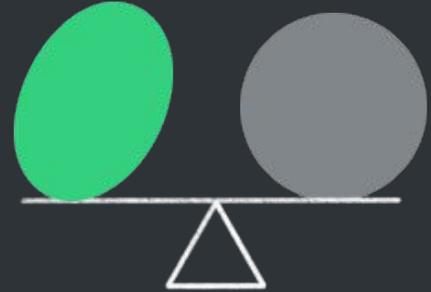- STEM and Humanities

- Board games

Agenda

Introduction to Stablecoins

1. Cryptocurrency

2. Minimizes Volatility

3. Pegged to Asset
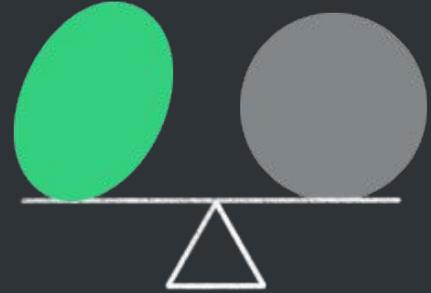
Examples of Stablecoins

1. Tether (USDT)
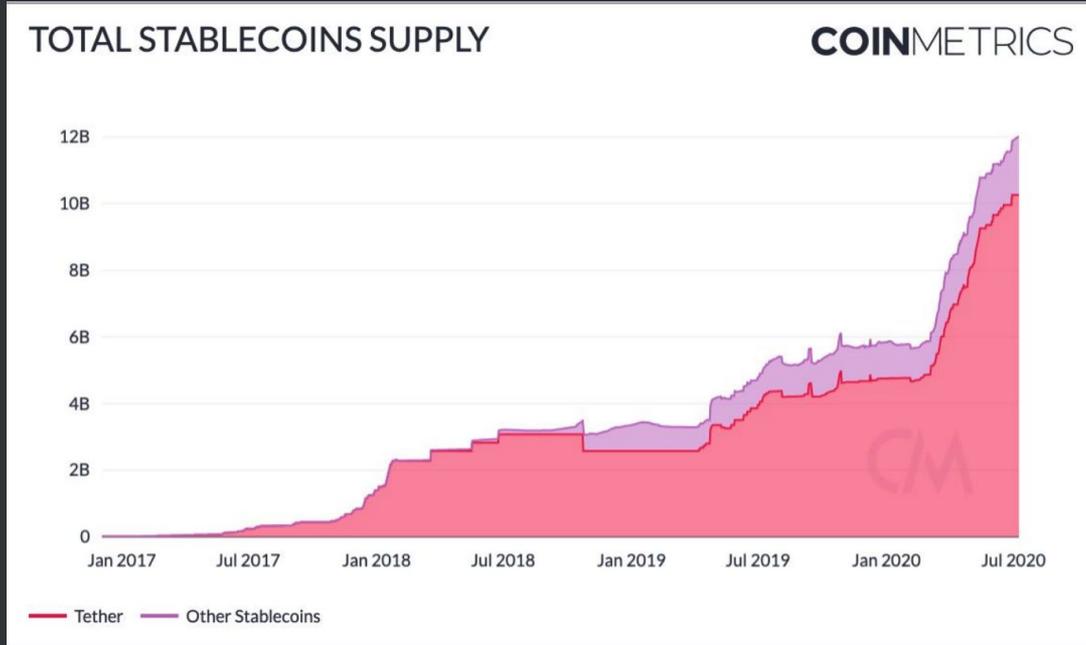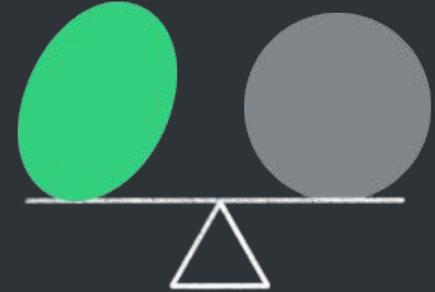2. USDC
3. DAI
4. cUSD (Celo Dollars)

- Launched in 2014

- For every USDT minted, Tether Foundation keeps $1 USD in reserve
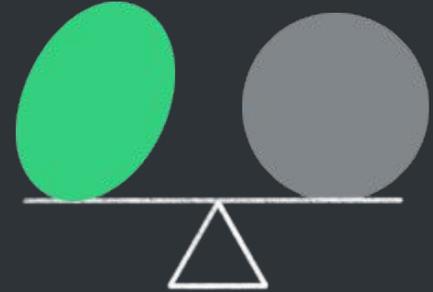
Rise of Tether (Continued)

Source: The Rise of Stablecoins, Coinmetrics
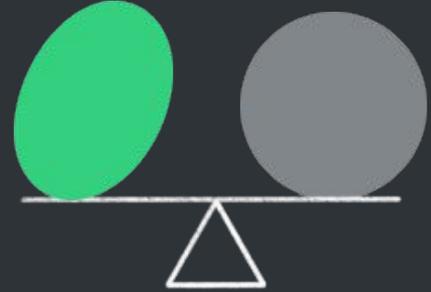
Tether Alternatives

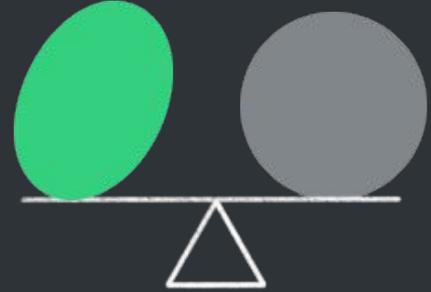# 1. USDC (Circle + Coinbase)

2. GUSD (Gemini Dollars)

MakerDAO

- DAI is the native Asset

- Pegged to USD

- Backed By ETH

- Decentralized

Celo Dollar

- Native Stablecoin Asset on Celo
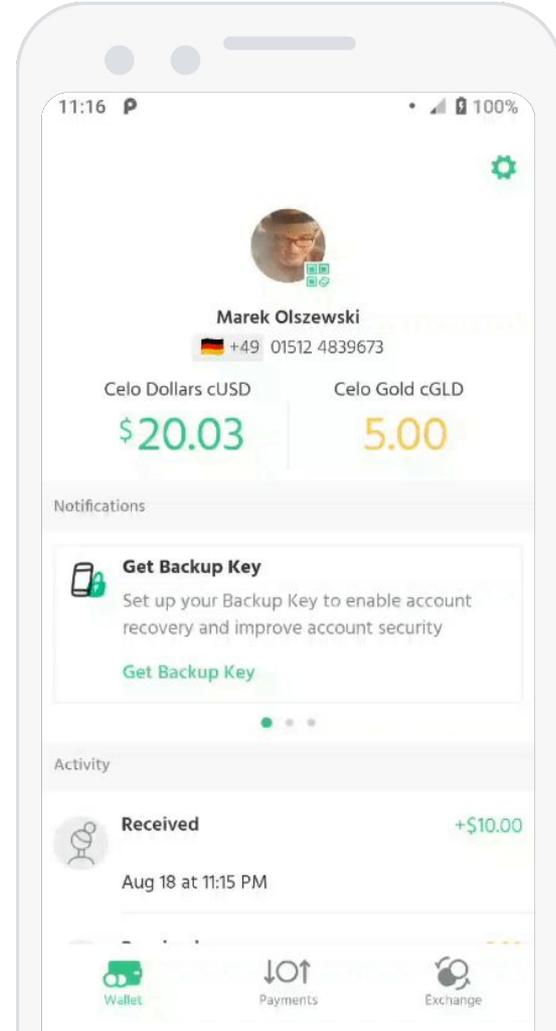
- Pegged to USD

March 2020 Effect

Introduction to Celo

Our mission

Build a monetary system that creates conditions of prosperity for all.

Celo Architecture Overview

- Mobile-first Blockchain
- Proof-of-Stake
- EVM-based Network

Validators

Full Nodes

Light Clients

Light Client + Application
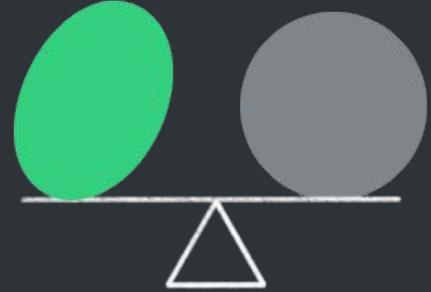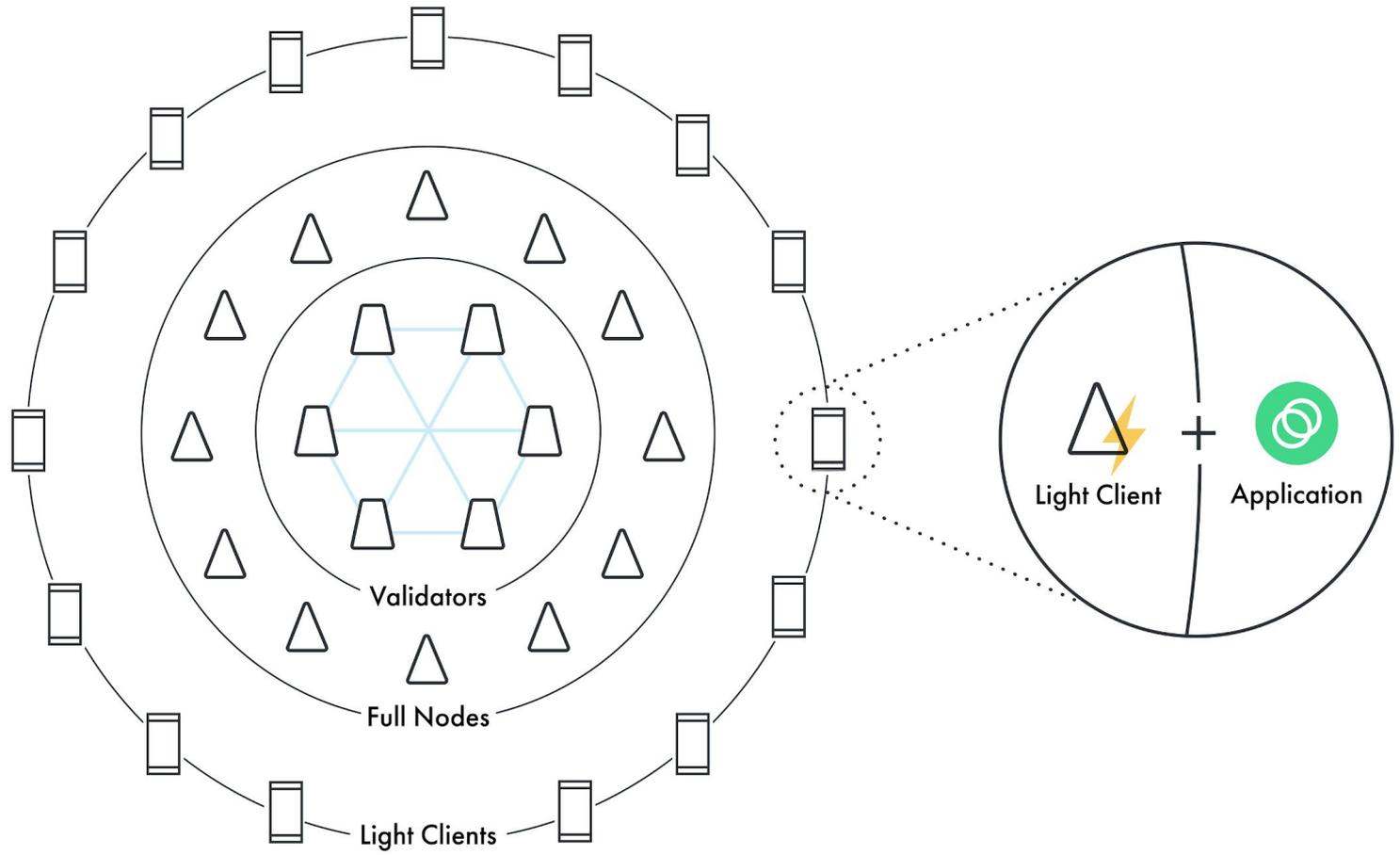
Address-based Encryption

- Variant on identity-based encryption

- Register address-> public key in smart contract

- Perform attestation randomly on registrant

- Can work with phone numbers, emails, 2FA

5. Complete Attestation with the signed attestation message

Wallet

1. Request Attestations

2. Randomly selected Validators

Smart Contract

Attestation Service

3. Reveal Phone Number to Issuer

4. Send signed attestation via SMS message
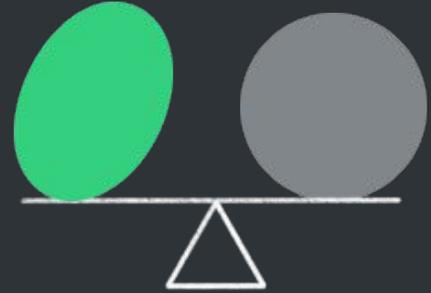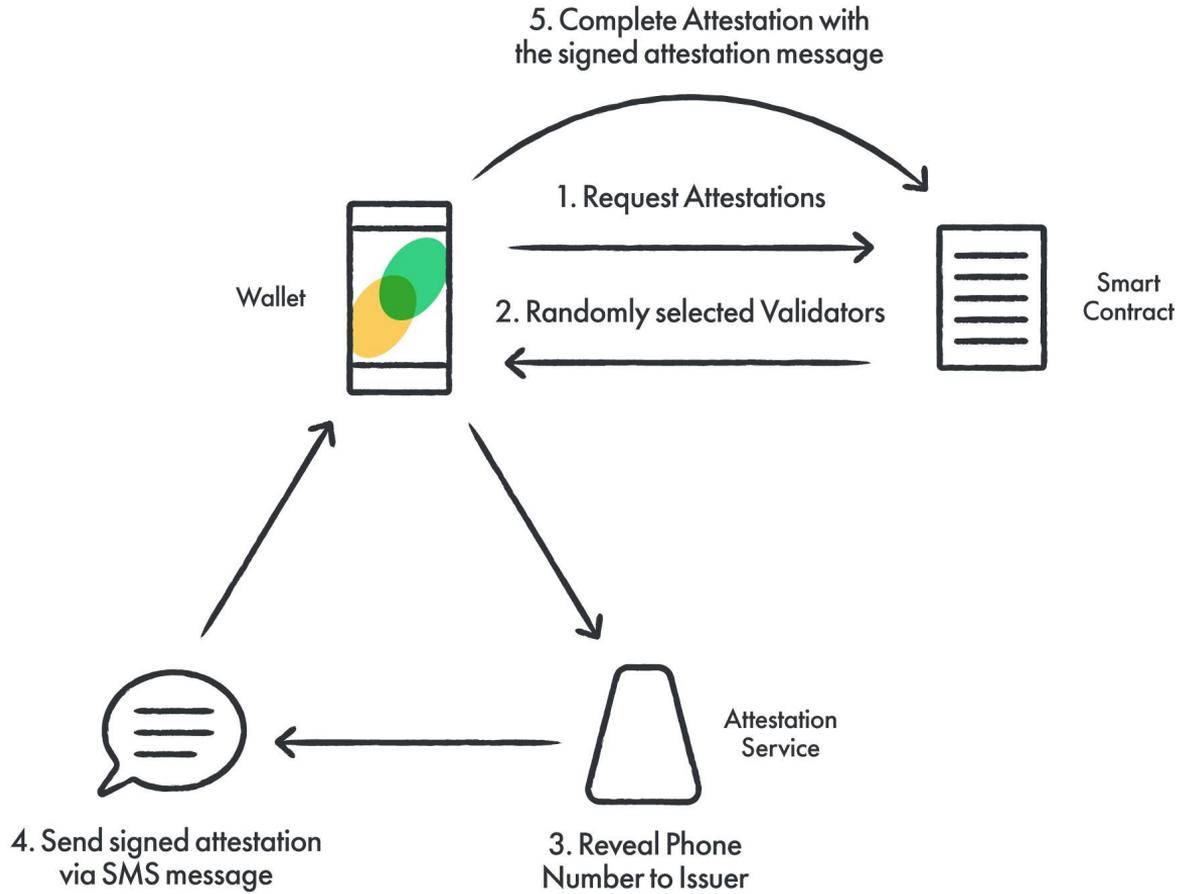
Reputation Scoring

- EigenTrust to score reputation based on phone contacts.

- Privacy-preserving through ZKProof.
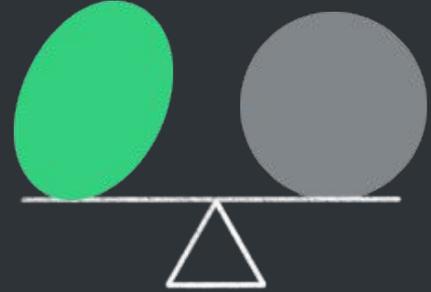
Stability Protocol Overview

Types of Stablecoins

1. Fiat collateralized

2. Crypto collateralized

3. Seigniorage style
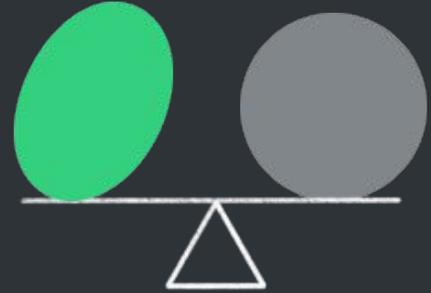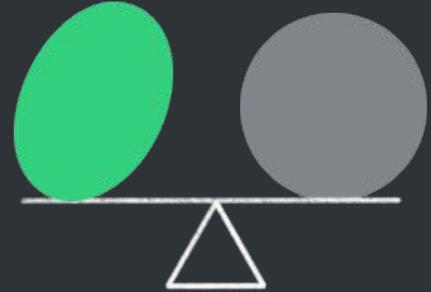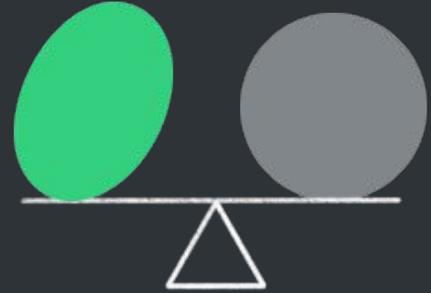
1. Fiat collateralized

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Types of Stablecoins

1. Fiat collateralized

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The Reserve

- Holds CELO and a diversified basket of non-Celo crypto assets

- Rebalanced periodically

- Used to stabilize issued Celo stablecoins (e.g. Celo Dollars)

- Mechanisms for increasing reserve ratio

  - Variable transfer fee on CELO

  - Epoch rewards

  - Stability fee
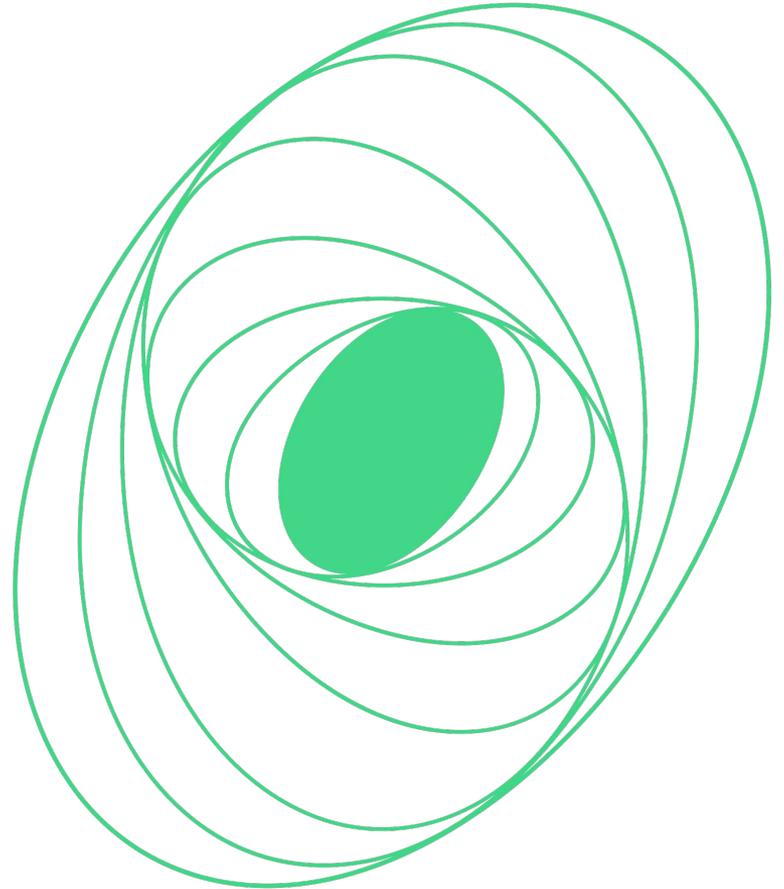
Expansions & Contractions

- Decentralized One-To-One Mechanism (DOTO)

  - Users can create new Celo Dollars by sending 1 US Dollar worth of CELO to a decentralized exchange.

  - Users can burn Celo Dollars by redeeming them for 1 US Dollar worth of CELO.

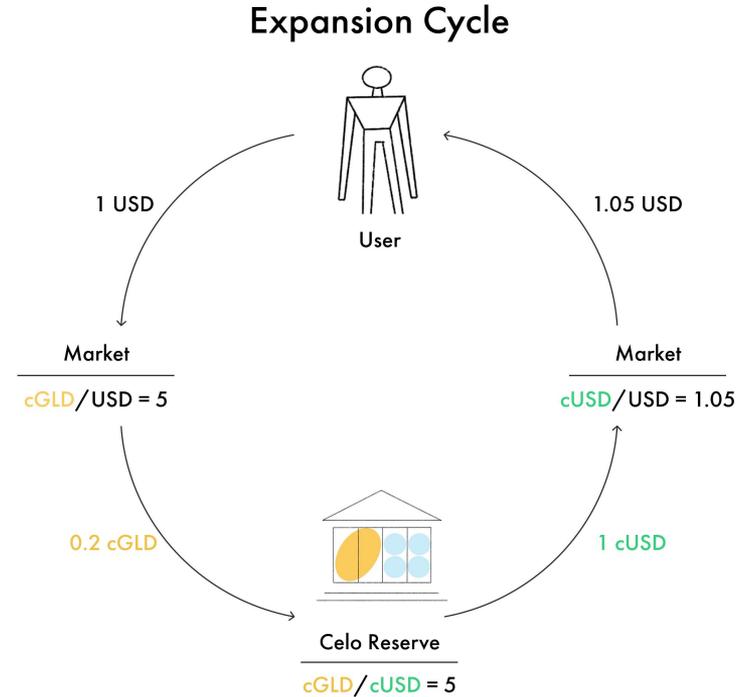- Creates incentives for contraction and expansion cycles.
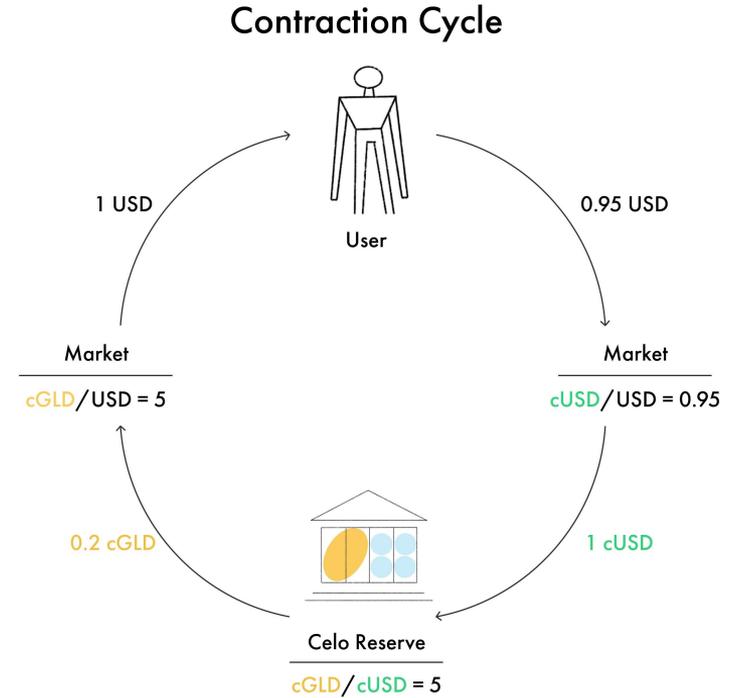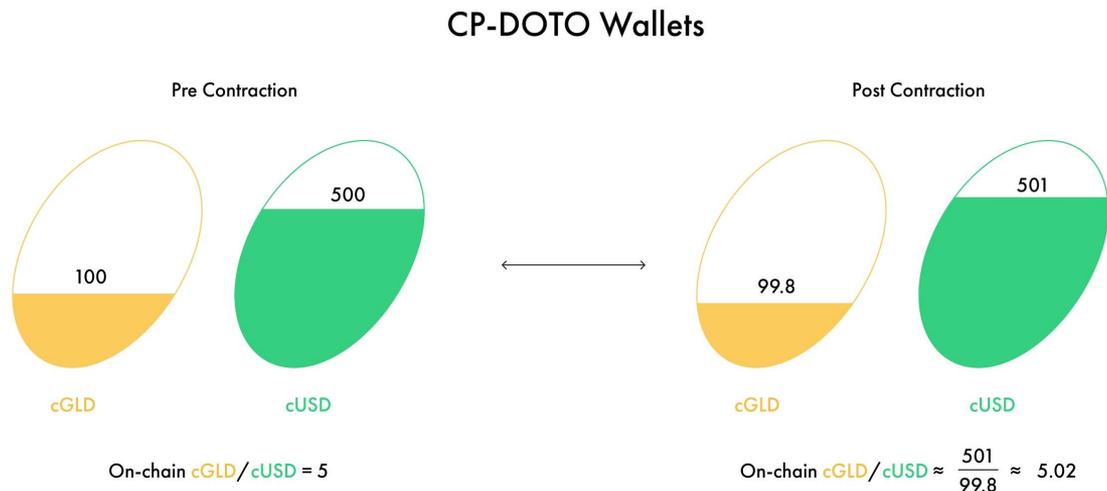
Contraction Cycle

Expansions & Contractions

- Decentralized One-To-One Mechanism (DOTO)

  - Users can create new Celo Dollars by sending 1 US Dollar worth of Celo Gold to a decentralized exchange.

  - Users can burn Celo Dollars by redeeming them for 1 US Dollar worth of Celo Gold.

- Creates incentives for contraction and expansion cycles.

Expansion Cycle

User

1 USD

1.05 USD

Market

cGLD/USD = 5

Market

cUSD/USD = 1.05

0.2 cGLD

1 cUSD

Celo Reserve

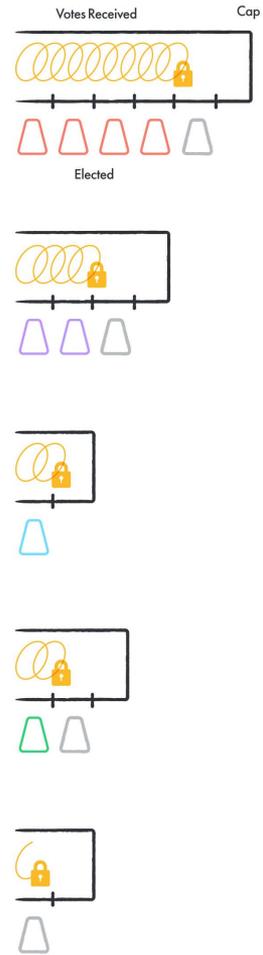cGLD/cUSD = 5

Expansions & Contractions

- Constant-Product Decentralized One-To-One Mechanism (CP-DOTO)

  - Mitigates the depletion potential of the DOTO Mechanism

  - Uses a constant-product market-maker model inspired by the Uniswap system to dynamically adjust on-chain price
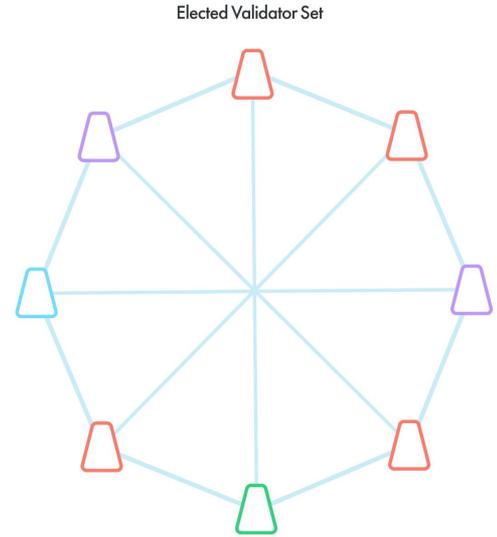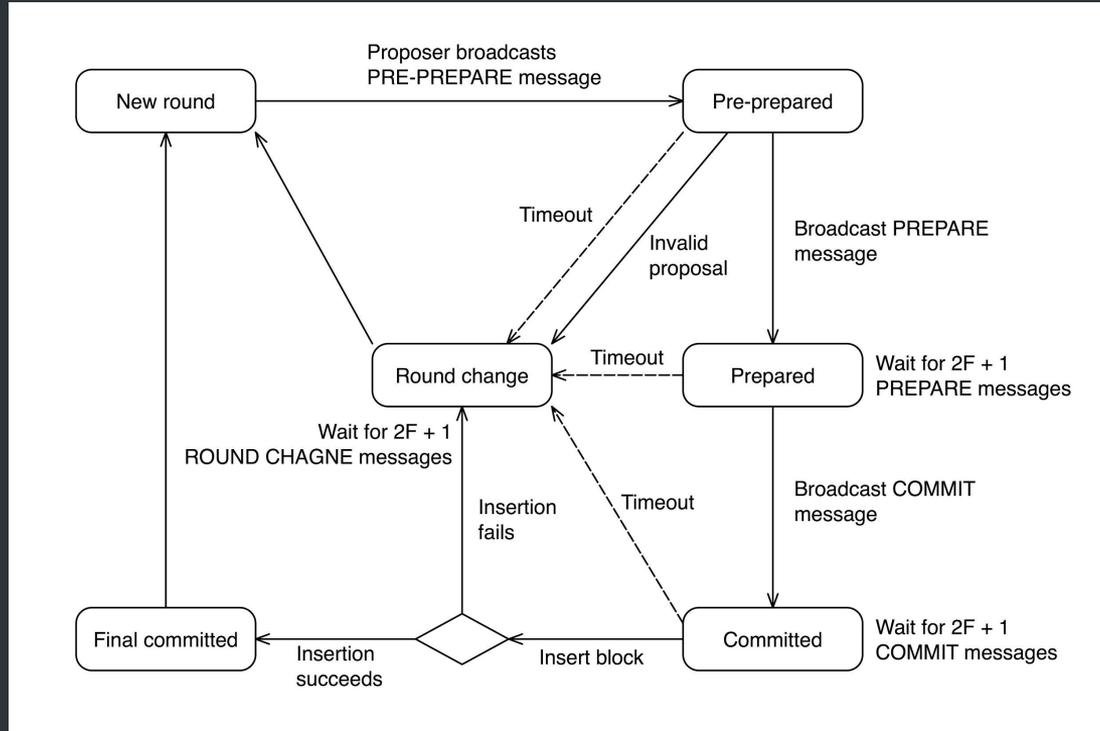
CP-DOTO Wallets

Pre Contraction

100   500

cGLD   cUSD

On-chain cGLD/cUSD = 5

Post Contraction

99.8   501

cGLD   cUSD

On-chain cGLD/cUSD ≈ $\frac{501}{99.8}$ ≈ 5.02

Consensus

Proof of Stake

Votes Received   Cap

Elected

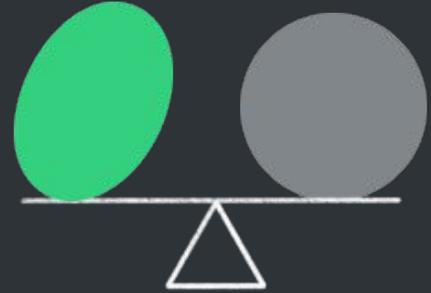Shuffled →

Elected Validator Set
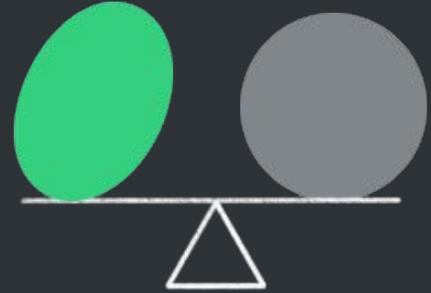
Istanbul Byzantine Fault Tolerance Consensus

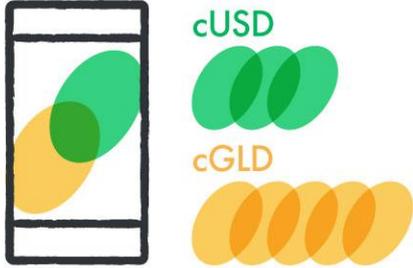Node Discovery

1. Discovery v4
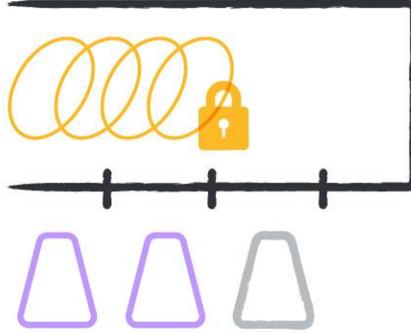2. Modified to look at NetworkID

Validating

1. 100 Validator Cap

2. 1 Day Epochs

3. Validator Groups

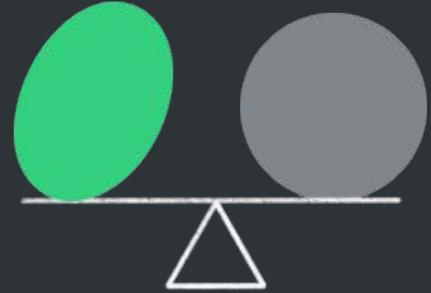4. Webinar

User · Group · Validator
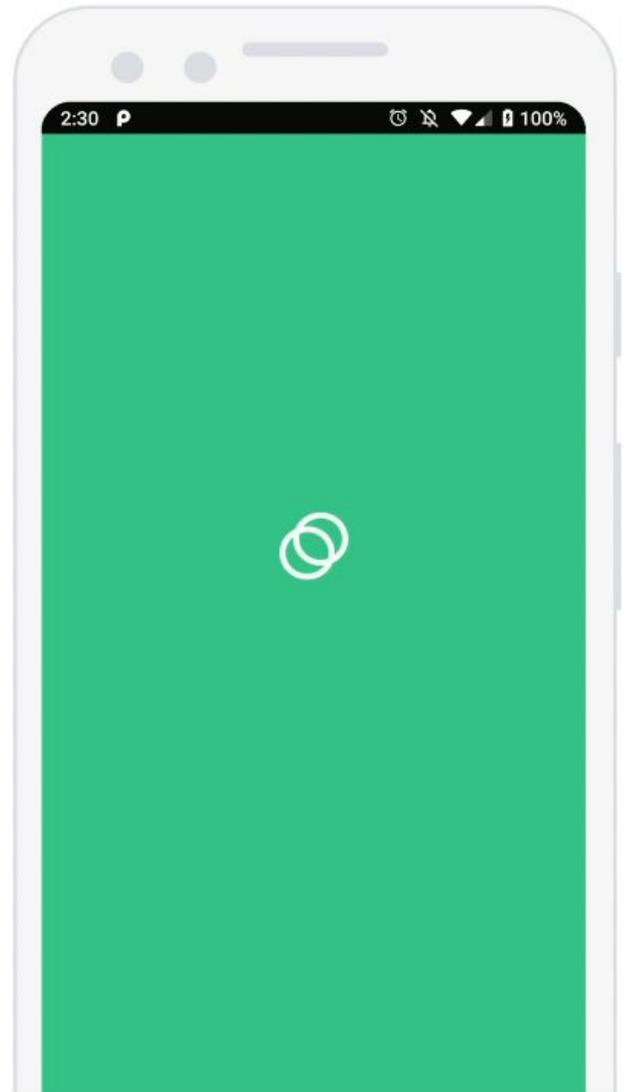
cUSD

cGLD

Mobile-First

Mobile-first Blockchain

1. More mobile users
   globally

2. Better UX/UI

3. Emerging Markets

Valora
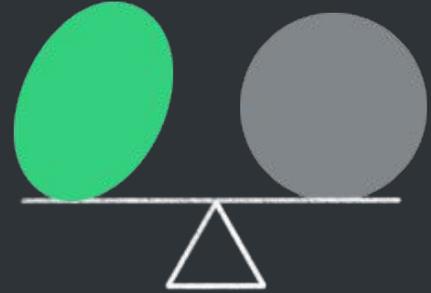
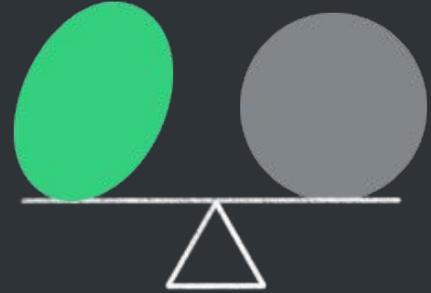Visit valorapp.com

Comparison to Other Networks

Differences to Polkadot

1. Para and relay chains.

2. Parachain slots.

3. Communications between parachains.

4. GRANDPA consensus

Differences to Cosmos

1. Unified API for Hubs.

2. Permissionless Hubs

3. Inter-blockchain comms

4. ABCI spec

Case Studies

Philippine Pilot

1. 23 testers

2. 5 merchants

3. Goal: Understand how people/businesses use electronic payments

Philippine Pilot Insights

1. Slow Internet Affects Transactions

2. Outdated smartphones.

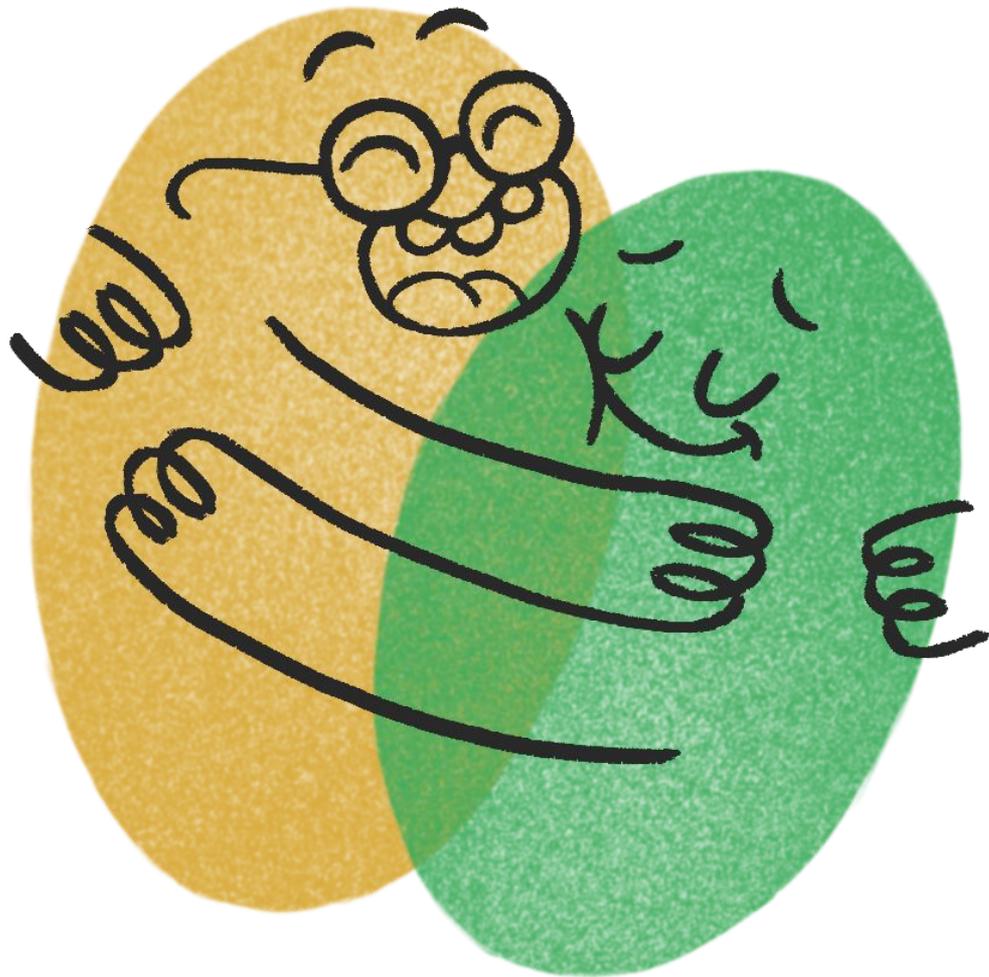3. Conserve data.

4. Low trust initially

Kenya Pilot

1. MPESA has 86% adoption

2. 24 Kenyans

3. Middle-class, rural & urban-poor

4. Diverse age group

Kenya Pilot Insights

1. Must speak to people's needs

2. Put new concepts in old frameworks

3. Word-of-mouth

4. Trust people over organizations

Q&A

Yaz Khoury
yaz@clabs.co
@Yazanator

celo