BLOCKCHAIN TECHNOLOGY IN FINANCE

Vladislav Dramaliev

Director, The BitHope Foundation

Marketing and Community Manager, æternity

Contents

Founder	Co-Founder
• **CoinFixer.com** | 2014 • **BitHope.org** | 2015 • **CryptoCrowd.org** | 2017	• **bitcoini.com** | 2013 • **Bulgarian Bitcoin Association** | 2014 • **Sofia Crypto Meetup** | 2016

- In the space since 2013
- Focused on **Sofia Crypto Meetup** and **BitHope.org**
- Part of the **æternity blockchain** team

Blockchain Tech

Decentralized Database

Data is stored in more than one location

Distributed and replicated

Consensus and immutability <chaining>

Cryptographic Security

Built on public/private key cryptography

Integrity of ledger

Process Automation

Smart Contracts

Automation of business logic processes

Programs incorporated in the database

Value Transfer

Fast clearing and settlement of value transfers

Improved digital assets management

Use-Cases

- Asset management
- **Payments, clearing, settlement**
- Identity management
- Regulatory compliance
- Contract management
- Risk free cash transfer
- Credit default swaps
- Loan services
- Digital assets platforms
- Internet of Things

- Remittance
- Car leasing
- Shared KYC services
- Contract management
- Governance/Decision-making
- Accounting systems
- Transportation platforms
- Notary services
- Events management
- Invoicing services

Payments, Clearing & Settlement (PCS)

Network of participants

Assets

Transfer Process
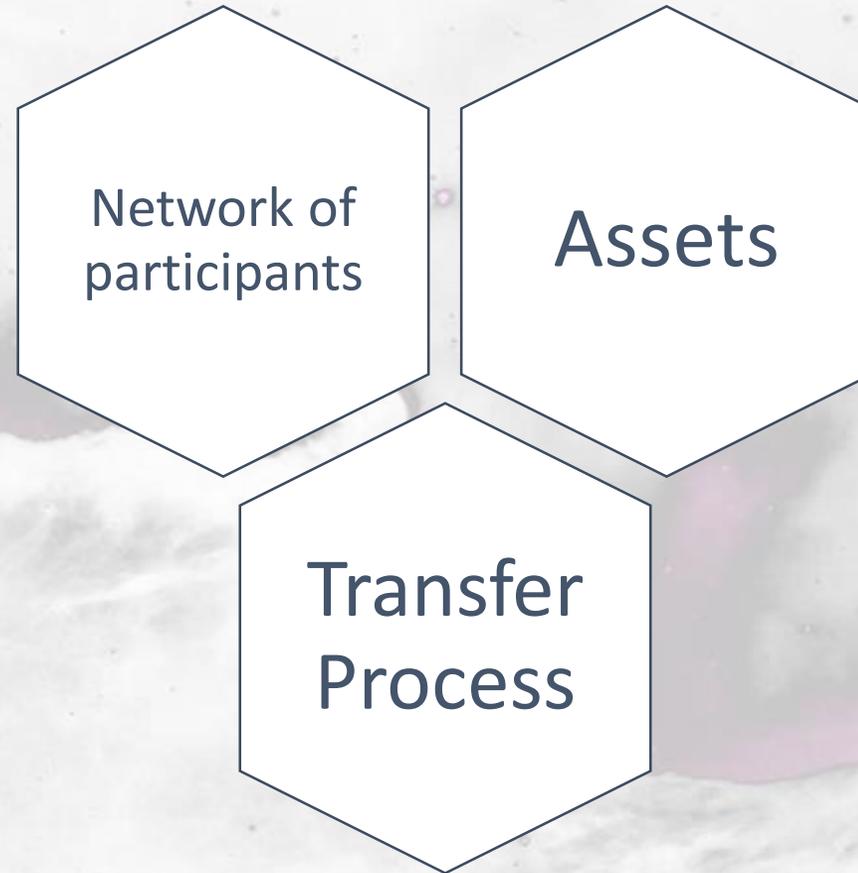
Financial Services - Overview
Payments Process & Post-trade Process of SCDs

Payments

- Submission
- Validation
- Conditionality
- Settlement

Securities, Commodities, & Derivatives

- Conf. Terms
- Clearing
- Settlement

Financial Services - Overview
Technological Evolution

- Increase in:
  - End-user expectations (speed & convenience)
  - Security threats

- Operate on decades-old infrastructure

- Have implemented technology slowly

- Large and complex electronic networks of participants

Financial Services - Overview
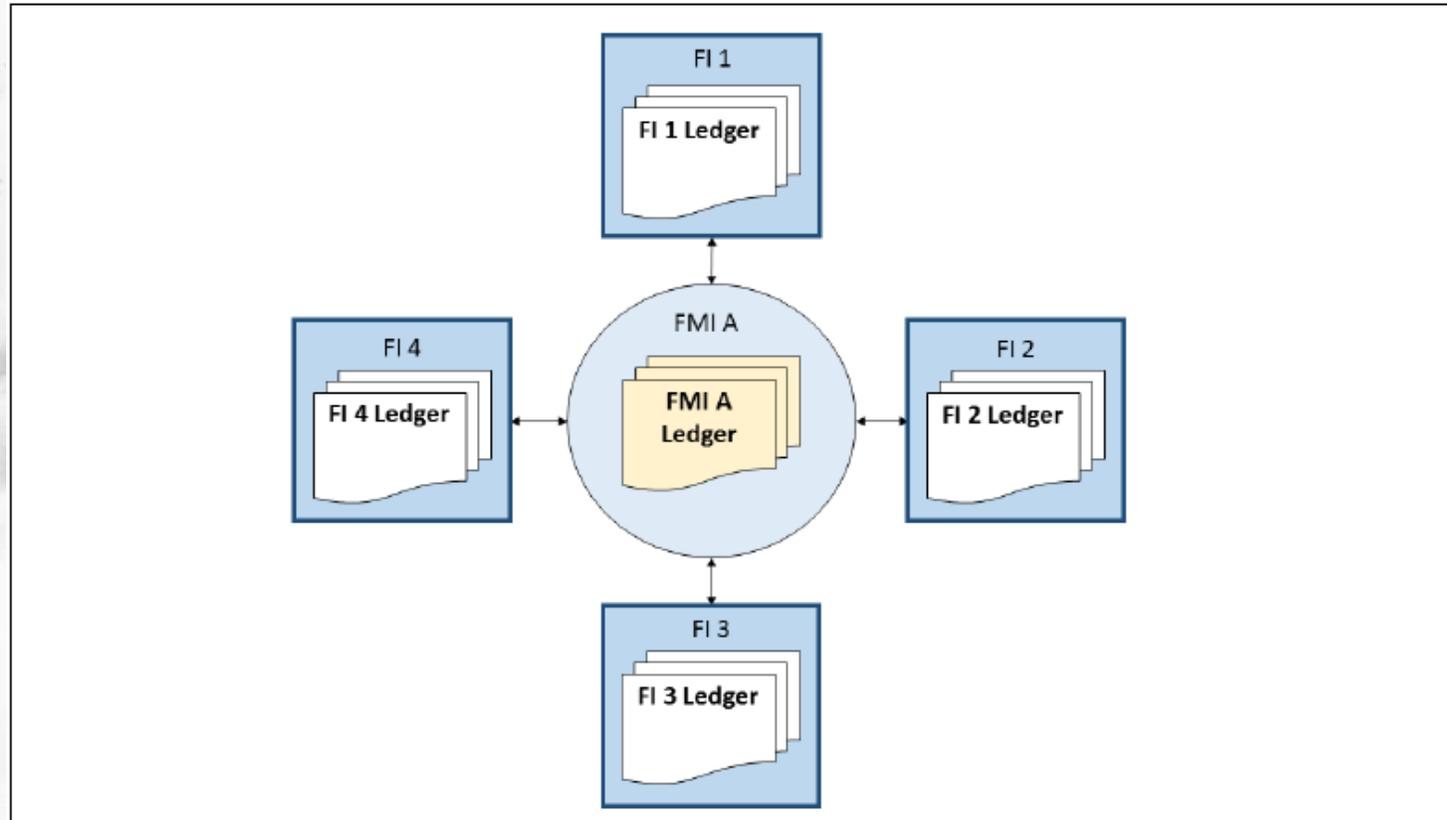## Financial Intermediaries in PCS

- Payment Systems

- Securities Settlement Systems (SSSs)

- Central Securities Depositories (CSDs)

- Central Counterparties (CCPs)

- Financial Market Infrastructures (FMIs)

  (manage risk/trust effectively and efficiently)
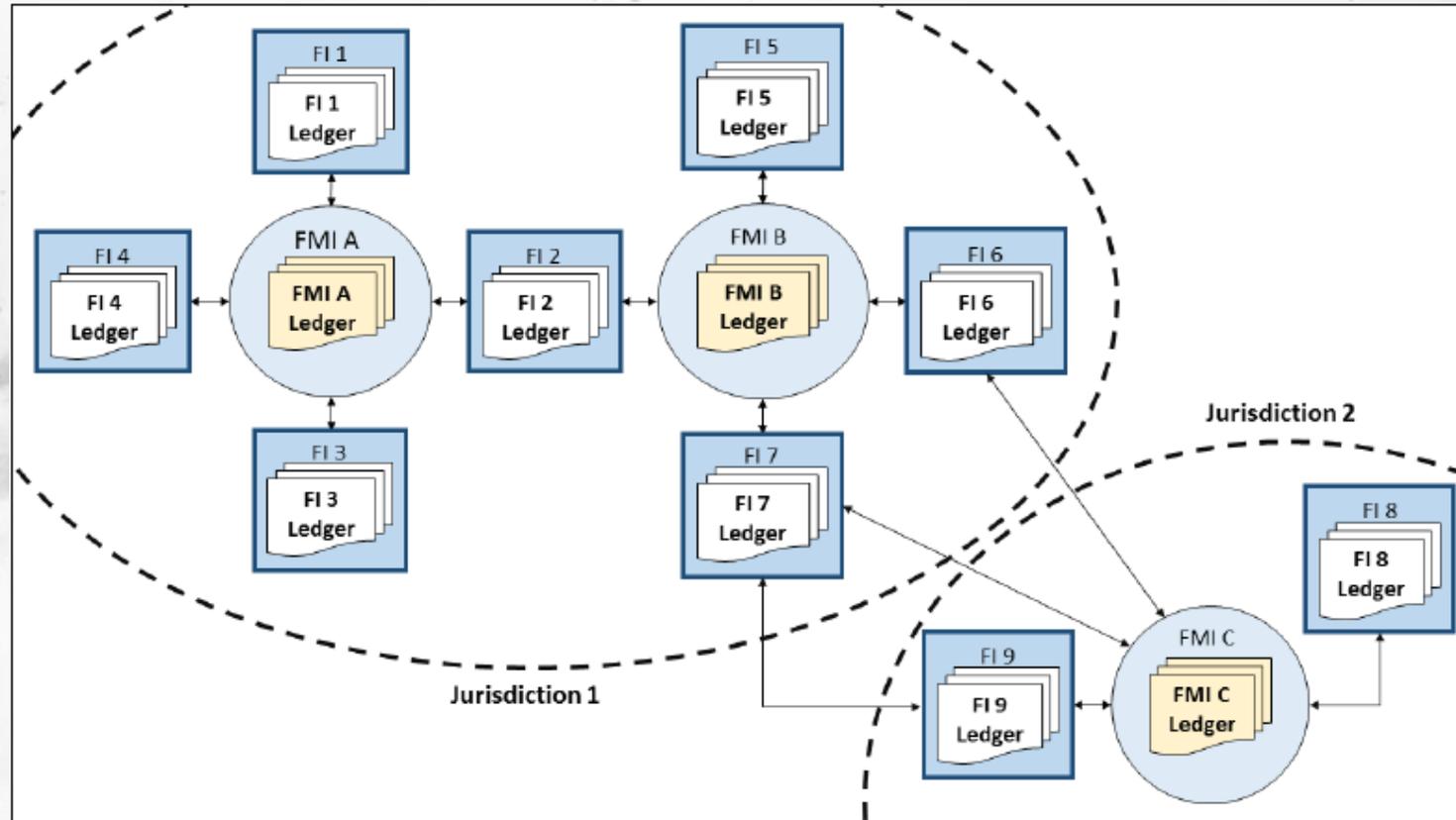
Financial Services - Overview
Financial Market Infrastructures

- "Hub & Spoke" Architecture
- FMI has the "master copy"
- FIs have their own copies (incl. TX that do to go through FMI)

Financial Services - Overview
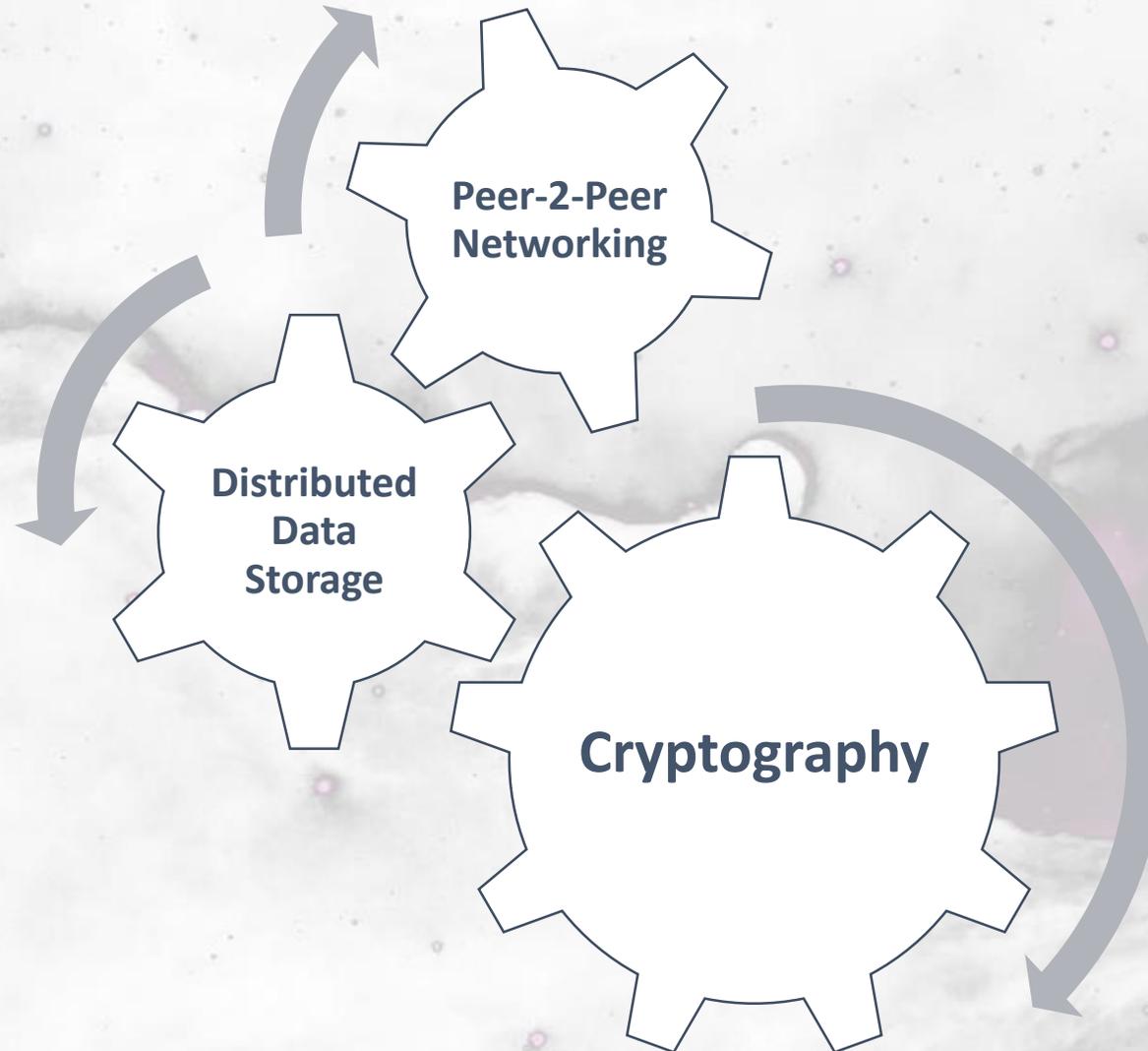## Financial Market Infrastructures

- Complex relationships

- Layers of legal and operational complexity

- Operational & financial inefficiencies -> abundance of participants

Financial Services – Blockchain
Blockchain Technology aka DLT
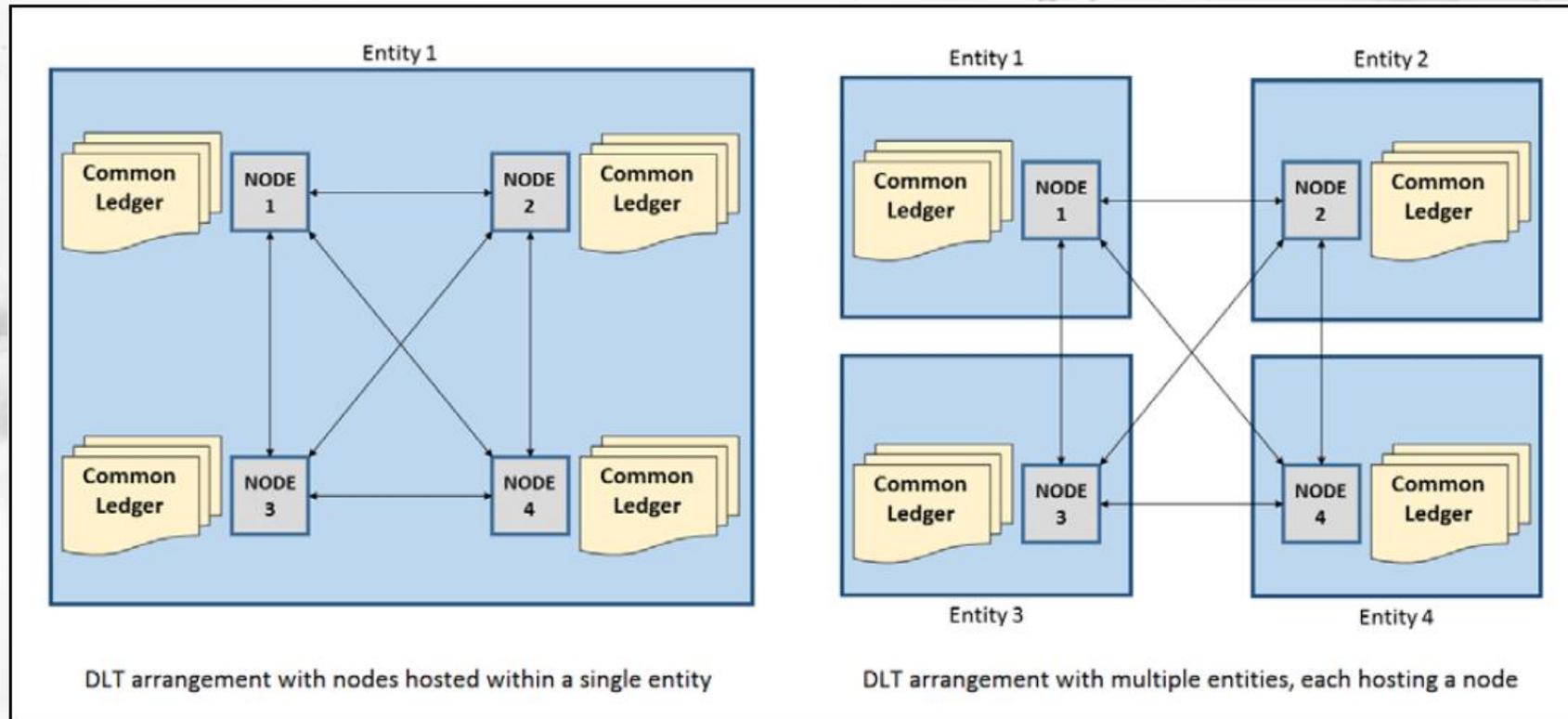
Peer-2-Peer Networking

Distributed Data Storage

Cryptography

- Change practices:
  - Storage
  - Recordkeeping
  - Transfer of assets

- Significant change in market structure

- Replace functions by FIs

- Change entire PCS processes

- Extreme: Use of banks to conduct payments -> obsolete

Financial Services – Blockchain
Blockchain Technology aka DLT

Entity 1

Common Ledger — NODE 1 — NODE 2 — Common Ledger

Common Ledger — NODE 3 — NODE 4 — Common Ledger

DLT arrangement with nodes hosted within a single entity

Entity 1 — Entity 2

Common Ledger — NODE 1 — NODE 2 — Common Ledger

Common Ledger — NODE 3 — NODE 4 — Common Ledger

Entity 3 — Entity 4

DLT arrangement with multiple entities, each hosting a node

- Blockchain/DLT = Database shared across nodes in network
- Nodes – running the software
- Collective maintenance of the ledger/database

Financial Services – Blockchain
Ledger Management

Ledger Management Responsibilities

(Peer-to-Peer)

End Users

Financial Institutions

FMIs

~~"Hub & Spokes"~~

~~Central Hub of Control~~

Financial Services – Blockchain
Open vs. Closed Blockchains (Blockchains vs. DLT)

- ## Open
  - Public (Internet)
  - Permissionless –> Bitcoin, Ethereum, Zcash, Dash, Litecoin
  - Technological Requirements

- ## Closed
  - Private (Ethernet)
  - Permissioned -> Ripple, Proof of concepts by EEA & R3
  - Specific Criteria (creditworthiness, licenses, contractual obligations)
  - CONTROL

Financial Services – Blockchain
Blockchain Tech in Finance

- **Reduced complexity** (especially in multiparty, cross-border transactions)

- Improved end-to-end **processing speed and availability** of assets and funds

- Decreased need for **reconciliation** across multiple recordkeeping infrastructures

- **Increased transparency and immutability** in transaction recordkeeping

- **Improved network resiliency** through distributed data management

- **Reduced operational and financial risks**

- **Asset-agnostic** –> any asset can be managed on a blockchain

Financial Services - Applications
Securities, Commodities, and Derivatives Transactions

Area of Interest	Improvement

• PoCs:
 	
    • Exchanges tracking ownership of "digital representations" of securities
 	
    • Tracking commodity "certificates"
	• Reduce info transfer times (exe. -> set.)
	
	• Increased speed & efficiency of operations
	
	• Shorter settlement cycles
	
	• Reducing middle and back office costs
	
	• Elimination of manual and duplicitous labor

Financial Services - Applications
Cross-border Payments

Issues	Effect
• Slow, indirect and expensive	• Direct relationship between counterparties
• Settlement for most common types-5 days	• Reduction of number of intermediaries
• No clarity on fees charges and settlement time	• Higher efficiency
• End-users pay the cost	• More transparency
• Opaqueness	
• Small & Medium-size banks – suffer too	

Financial Services - Applications
Financial Inclusion

Issues	Effect
• Difficult access to financial services for low-income households • High account fees • Need to travel to bank	• Mobile phone companies could use blockchain to provide financial services • Directly to end-user • Lower cost • Expanding access to new customer groups

Financial Services - Applications

Information-Sharing

Issues	Effect
• Fragmentation of information • Numerous parties	• "Read-only" access to parts of the ledger • Complete visibility of transactions coming from all participants • Real-time information

Financial Services - Issues
Issues in applying blockchain to finance

Business Issues	Technical Issues	Financial Design Issues
• Cost-benefit considerations	• Scalability	• Financial instruments
• Network effects	• Interoperability	• Monetary instruments
	• Development of standards	• Financial intermediaries
	• Cryptographic key & access data management	• Legal considerations
	• Information management	• Governance

The way towards mass adoption
Public Blockchains

- Scalability / Throughput

- User-friendliness / Ease-of-use (UX/UI)

- Privacy (better than pseudonymity)

- Reliability of "real-world data" (APIs)

- Regulatory requirements

- Attack vectors / R&D

- Mindset

vlad@aeternity.com

www.aeternity.com