

Decentralized Finance

Introduction and Overview of DeFi

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Logistics

- DeFi learning community
 - Over 1500 students in class
 - Join Discord for discussions: <https://discord.gg/3yFqmRjZDA>
 - All videos/slides/quizzes on course website
- Weekly quiz due the following Wed midnight PT
 - Only are graded for completion
- 2 labs release schedule on course website

What is Decentralized Finance (DeFi)?

- Financial infrastructure as an open, permissionless, and highly interoperable protocol stack built on public smart contract platforms

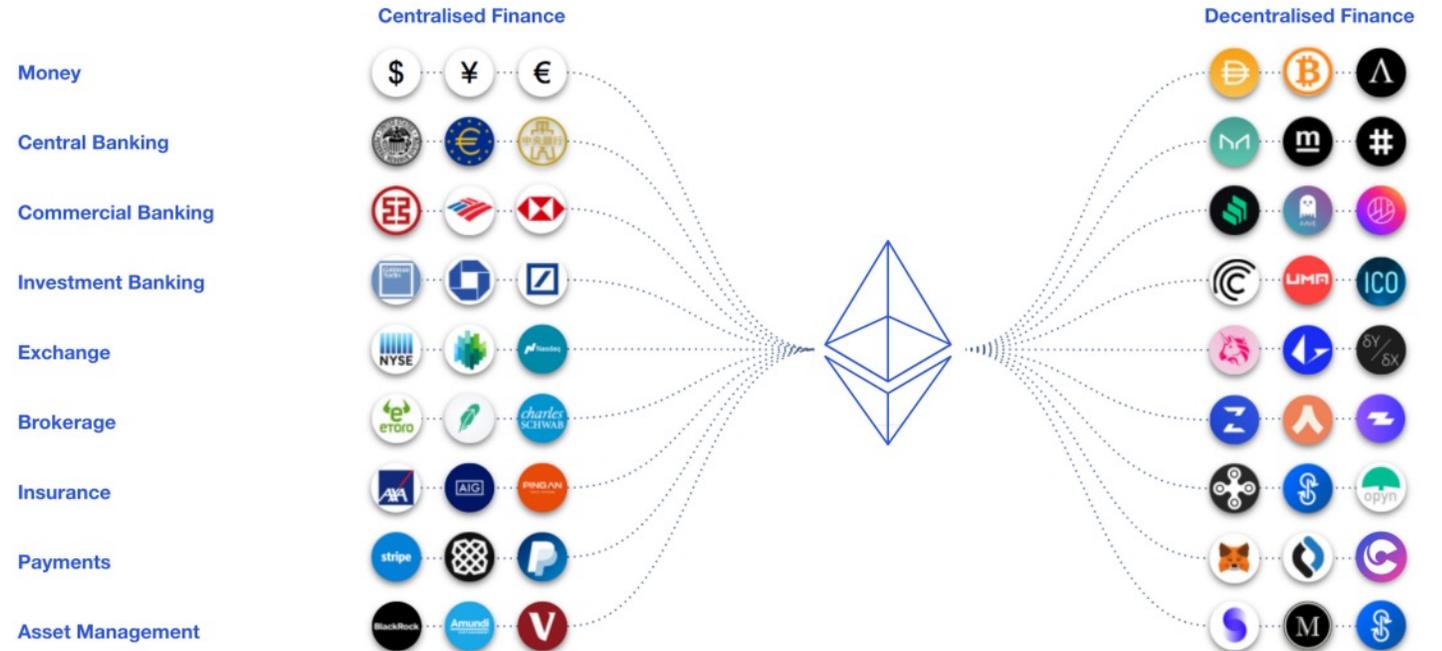
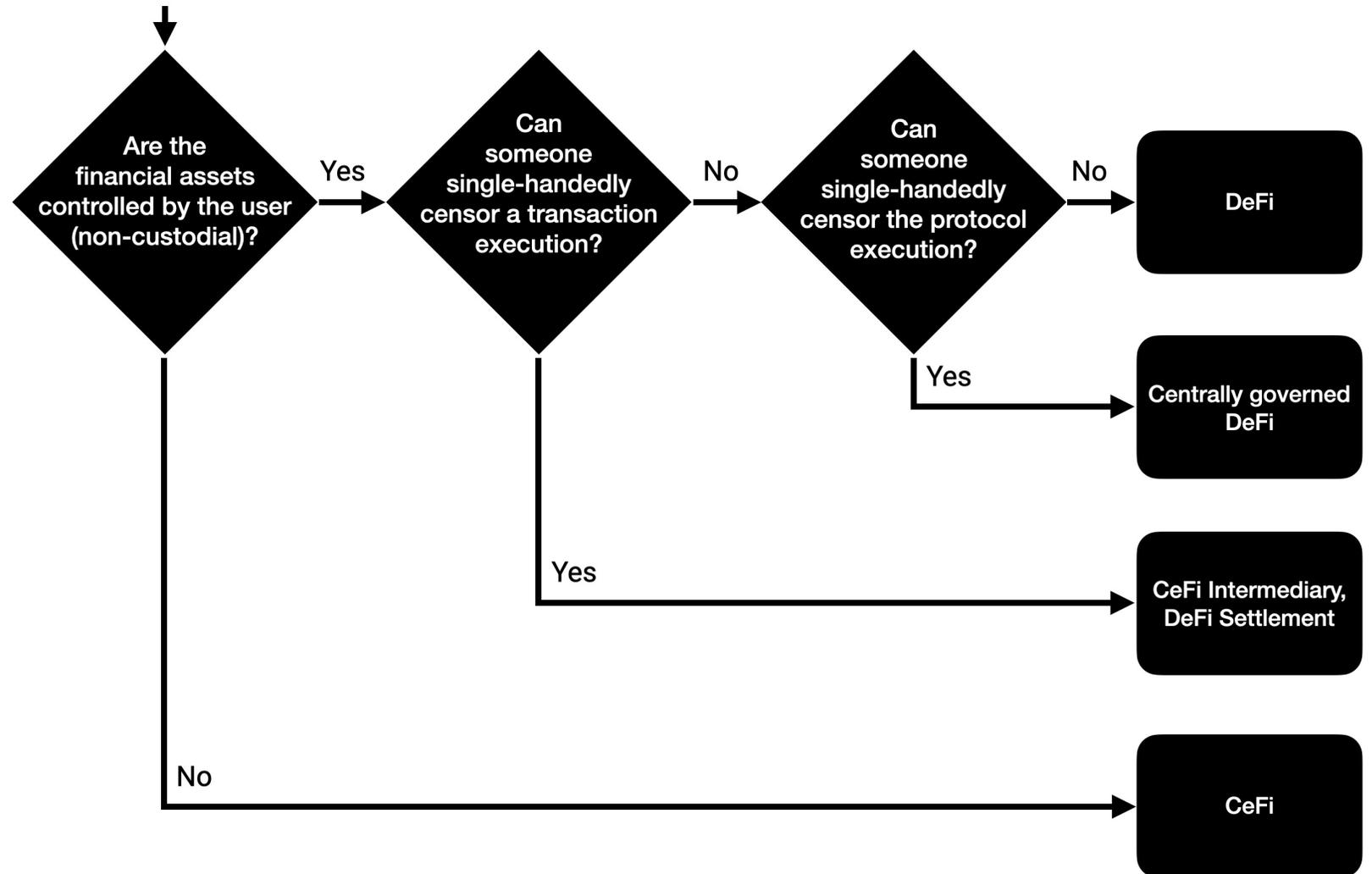


Image credit: Consensys Codefi

What is Decentralized Finance?

- Custody & settlement
- Transaction execution
- Protocol governance



CeFi vs. DeFi

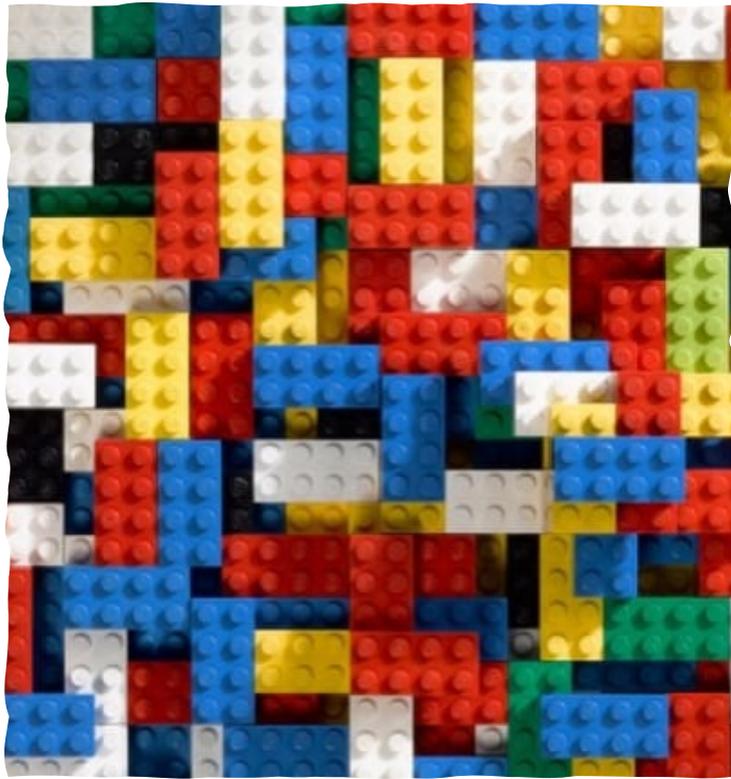
Traditional finance (CeFi)

- **Permissioned**
 - Closed-source system, built on top of centralized databases
 - Needs approval & agreement for third-party to use & build on
- **Custodial**
 - Assets are custodied by licensed third-parties
- **Centralized trust & governance**
 - Single entity responsible for upgrade decisions & admin privileges
- **Real identity**
 - Users register with real identity, e.g., for KYC/AML compliance

Decentralized finance (DeFi)

- **Permissionless**
 - Open-source system; built on top of permissionless blockchains
 - Anyone can use/ interoperate or build on top without third-party approval & agreement
- **Non-custodial**
 - Assets are not custodied by a single third-party
- **Decentralized trust & governance; Trustless**
 - No single entity responsible for upgrade decisions & admin privileges
- **Pseudonymous; privacy**
 - Users usually do not provide real identities

DeFi Advantages



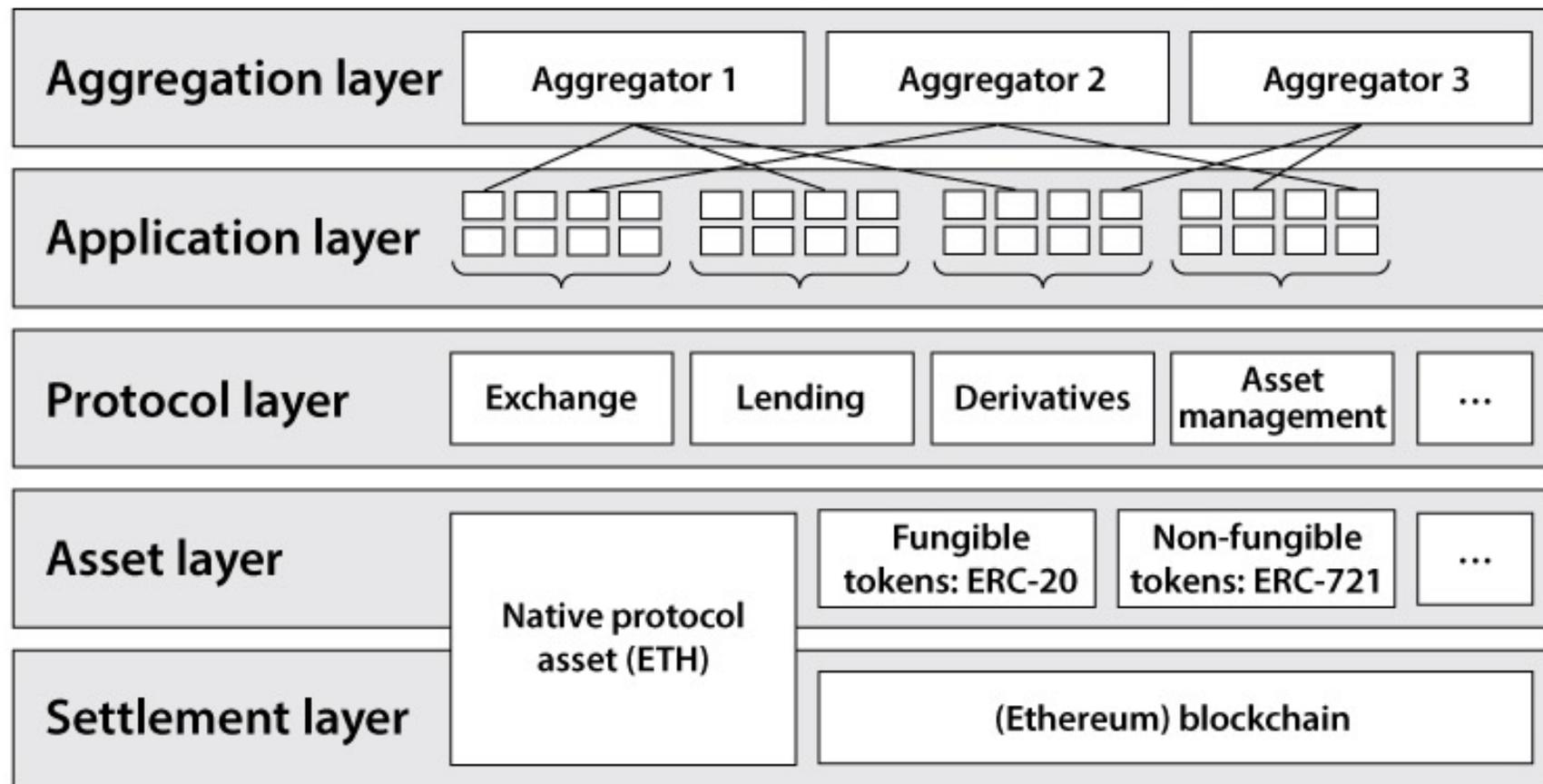
- Efficiency
 - Removing rent-seeking intermediaries
- Open finance and universal accessibility
 - Inclusive
- Transparency and public verifiability
 - Anyone can inspect the smart contract code and verify the execution and state of the system
- Self custody and censorship resistant
- Automation & programmability
- Composability and interoperability
- Innovation
 - DeFi applications often are much simpler and faster to develop than CeFi counterparts
 - E.g., Uniswap vs. CEX
 - Atomic composability
 - E.g., Flash loan

DeFi Stack

- DeFi is enabled by a decentralized smart contract platform

- Roles

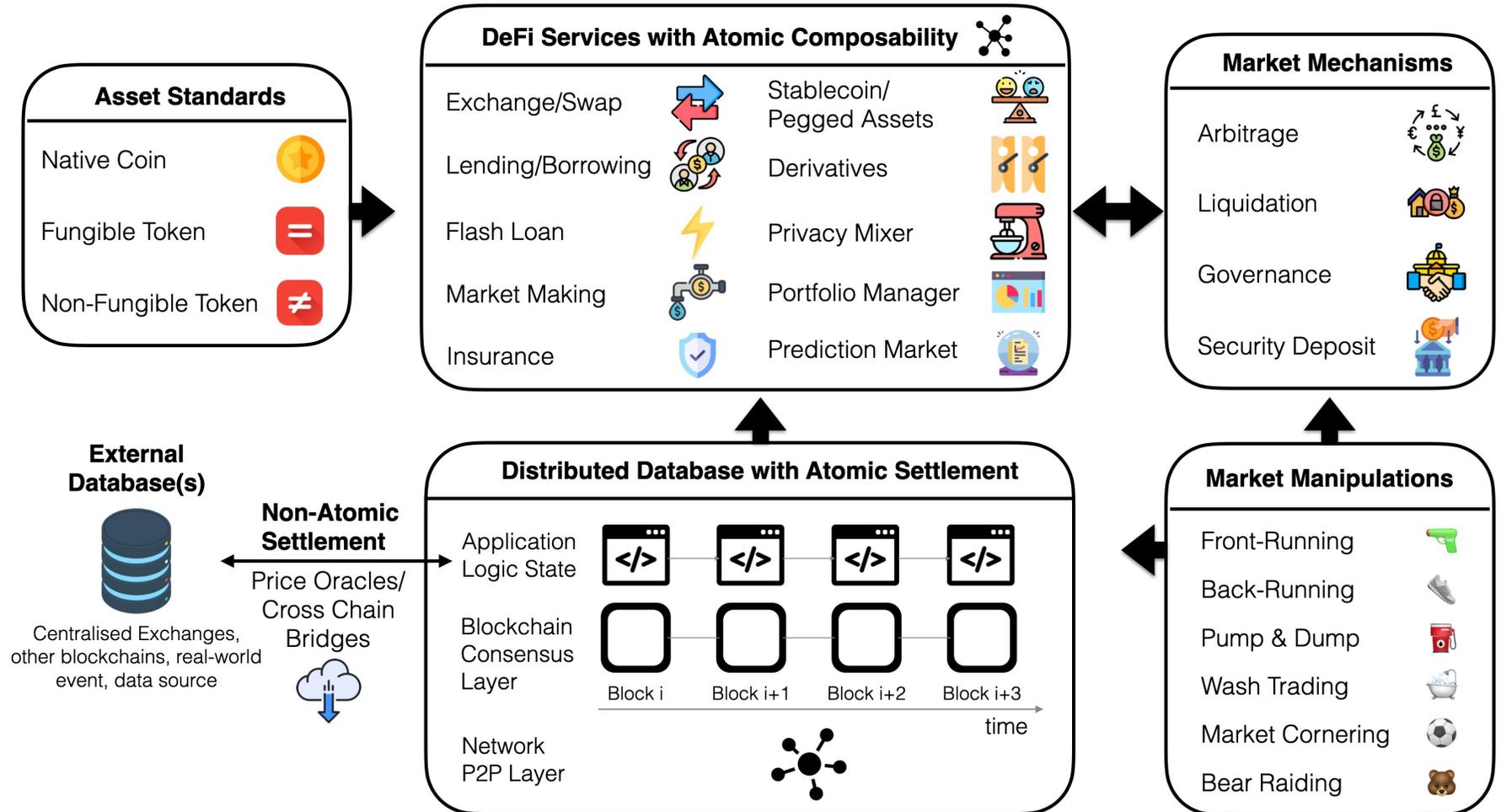
- User
- Protocol (smart contract)
 - Governance



DeFi Stack

Roles

- User
- Protocol
- Keeper
- Oracle
- Bridge



Open Research Challenges

- Scalability
- Universal accessibility; usability
- Privacy (privacy with compliance)
- Security
 - Oracle
 - Program/protocol analysis and verification
 - Protocol security
 - Smart contract security
 - Composability risks/systemic risks
 - Incentive design
 - Miner extractable value
 - Governance
- Legal framework

Course Syllabus

Date	Topic
08/26	Introduction and Overview of DeFi
09/02	Introduction to Blockchain Technology
09/09	Introduction to Smart Contracts
09/16	Introduction to Traditional Finance
09/23	Stablecoins
09/30	DEX
10/07	Decentralized Lending
10/14	Synthetic And Derivatives; Portfolio Management; Insurance; Information and Data Markets
10/21	Oracles
10/28	Privacy in DeFi; Auditable Privacy; ZKP
11/04	Decentralized Identities
11/11	No Class (Veterans Day)
11/18	DeFi Security I
11/25	No Class (Thanksgiving)
12/02	DeFi Security II
12/09	Regulations and Legal Frameworks

NFT for Course Completion

- Everyone who finishes the course will get an NFT for course completion
 - More info to follow

