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INTERNATIONAL  
BUSINESS SCHOOL

# The Crypto/DeFi World

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# Outline

- Services the Financial System Provides
- Regulatory Objectives
- Challenges for Regulating by Activity
- Ledgers
- The Crypto/DeFi World
- Mapping the Financial and Economic System
- Financial Services in the Crypto/DeFi World
- Challenges for Regulating the Crypto/DeFi World

# Financial Services

- Payments system access
- Lending and credit provision
- Advising
- Safekeeping and accounting
- Issuance of deposits and payment instruments
- Liquidity provision
- Diversification and risk pooling
- Financial market access and market making
- Derivatives-based risk transfer
- Equity and debt underwriting
- Collecting and processing information

# Regulatory Objectives

- **Consumer and Investor Protection:**  
Data ownership, Anti-fraud, Anti-discrimination, Conflict of interest, Suitability, Continuity of access (run risk, operational risk)
- **Market Efficiency and Integrity:**  
Price transparency, Competition, Resilience
- **Crime Prevention:**  
Anti-money laundering (AML), Know your customer (KYC)
- **Systemic Stability:**  
Run risk, Common exposure, Procyclicality, Operational risk

Activity, Function or Service	Consumer Protection	Investor Protection	Market Efficiency and Integrity	Crime Prevention	Systemic Stability
Payments system access	Anti-fraud Op risk	Anti-fraud Op risk	Transparency, Competition Anti-fraud	KYC/AML	Runs Op risk
Lending and credit provision	Suitability Anti-discrimination	Suitability Anti-fraud	Transparency, Competition Anti-fraud	KYC/AML	Fire sales Runs
Advising	Suitability	Suitability			
Safekeeping and accounting	Anti-fraud Op risk	Anti-fraud Op risk		KYC/AML	Op risk
Issuance of deposits and payment instruments	Stable value Property rights	Stable value Property rights	Resilience	KYC/AML	Fire sales Runs
Liquidity provision	Runs	Runs	Resilience	KYC/AML	Fire sales Runs
Diversification and risk pooling	Anti-fraud	Anti-fraud			Common Exposure
Financial market access and market making	Continuity of Access Op Risk	Price Transparency	Transparency, Competition Anti-fraud	KYC/AML	Fire sales Runs
Derivatives-based risk transfer	Suitability	Suitability		KYC/AML	Common Exposure
Equity and debt underwriting	Suitability	Transparency Conflict of Interest	Transparency, Competition Anti-fraud	KYC/AML	
Collecting and processing information	Data ownership	Anti-fraud	Transparency, Competition Anti-fraud	KYC/AML	Op risk
<b>Current Regulator (by institutional form)</b>	<b>Conduct, Pension, Insurance, Competition</b>	<b>Securities, Derivatives, Competition</b>	<b>Securities, Derivatives, Competition</b>	<b>Financial Crimes Enforcers</b>	<b>Macroprudential Authorities</b>
<b>Microprudential</b>					

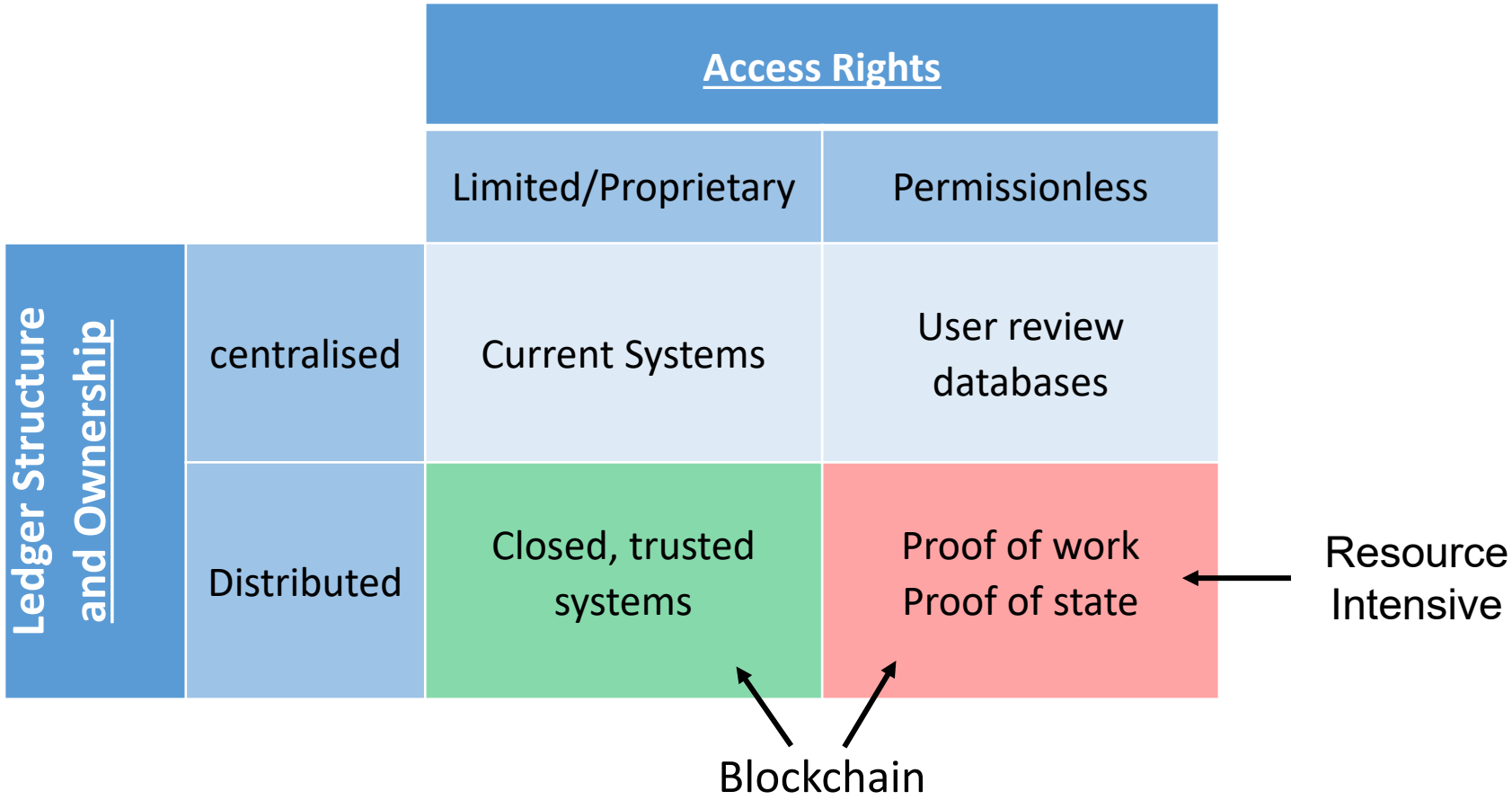
# Regulating by Activity

- Enforce the principle of **same service, same risk, same regulation**
- Shift from regulating by institutional form to regulating by function
- Allow innovation while safeguarding safety and resilience

Activity, Function or Service	Consumer Protection	Investor Protection	Market Efficiency and Integrity	Crime Prevention	Systemic Stability	Regulate by function
Payments system access	Anti-fraud Op risk	Anti-fraud Op risk	Transparency, Competition Anti-fraud	KYC/AML	Runs Op risk	<b>These are the regulatory authorities we need!</b>
Lending and credit provision	Suitability Anti-discrimination	Suitability Anti-fraud	Transparency, Competition Anti-fraud	KYC/AML	Fire sales Runs	
Advising	Suitability	Suitability				
Safekeeping and accounting	Anti-fraud Op risk	Anti-fraud Op risk		KYC/AML	Op risk	
Issuance of deposits and payment instruments	Stable value Property rights	Stable value Property rights	Resilience	KYC/AML	Fire sales Runs	
Liquidity provision	Runs	Runs	Resilience	KYC/AML	Fire sales Runs	
Diversification and risk pooling	Anti-fraud	Anti-fraud			Common Exposure	
Financial market access and market making	Continuity of Access Op Risk	Price Transparency	Transparency, Competition Anti-fraud	KYC/AML	Fire sales Runs	
Derivatives-based risk transfer	Suitability	Suitability		KYC/AML	Common Exposure	
Equity and debt underwriting	Suitability	Transparency Conflict of Interest	Transparency, Competition Anti-fraud	KYC/AML		
Collecting and processing information	Data ownership	Anti-fraud	Transparency, Competition Anti-fraud	KYC/AML	Op risk	
<b>Current Regulator (by institutional form)</b>	<b>Conduct, Pension, Insurance, Competition</b>	<b>Securities, Derivatives, Competition</b>	<b>Securities, Derivatives, Competition</b>	<b>Financial Crimes Enforcers</b>	<b>Macroprudential Authorities</b>	

# A General Classification System for Ledgers

Record the current state and the transition to the next state





# The Crypto/DeFi World: A Few Definitions

- Crypto assets
  - Security tokens (equivalent to depository receipts)
  - Reserve-backed stablecoins (analogous money market funds)
  - Algorithmic stablecoins (backed by other crypto assets)
  - Unbacked
    - Native tokens: minted through a blockchains consensus mechanism, such as mining
    - Other: utility tokens, governance tokens, and native tokens
- DeFi
  - Providing services without intermediaries
  - Record-keeping is decentralised
  - Access is anonymous and unrestricted (bottom right of the table)

# The Crypto/DeFi World: Smart Contracts

- Smart contracts are self-executing pieces of code
- No recourse to the legal system or ability to correct errors
- Issues:
  - Is full decentralisation possible (or desirable)?
  - How can you get needed information from the real economy or the traditional system?
  - Can you write complete contracts?
  - What happens where there is a need/agreement to make changes?
  - Can you build a financial system without laws, courts, and judges?

# The Crypto/DeFi World

- General Concerns:

- Consumer and investor protection: Property rights, stable value
- Market efficiency and integrity: Resilience
- Crime prevention: anti-money laundering (AML) and know your customer (KYC)
- Systemic stability: runs, common exposures, and procyclicality  
(arising from leverage, opacity, and interconnectedness)

- Regulatory reaction:

Impose the same requirements as those for current instruments and issuers

- Stablecoins: payment instrument issuers should meet bank regulatory requirements
- Crypto-assets: meet suitability, disclosure, reporting, and AML/KYC requirements

# Not-so-safekeeping

- Hacks

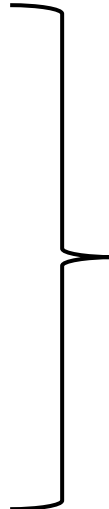
- 2014-2022: 47 attacks
- >\$3 billion lost
- Latest: Ronin Network >\$600 million

- 51% Attacks

- Makarov and Schoar list 33 since 2021

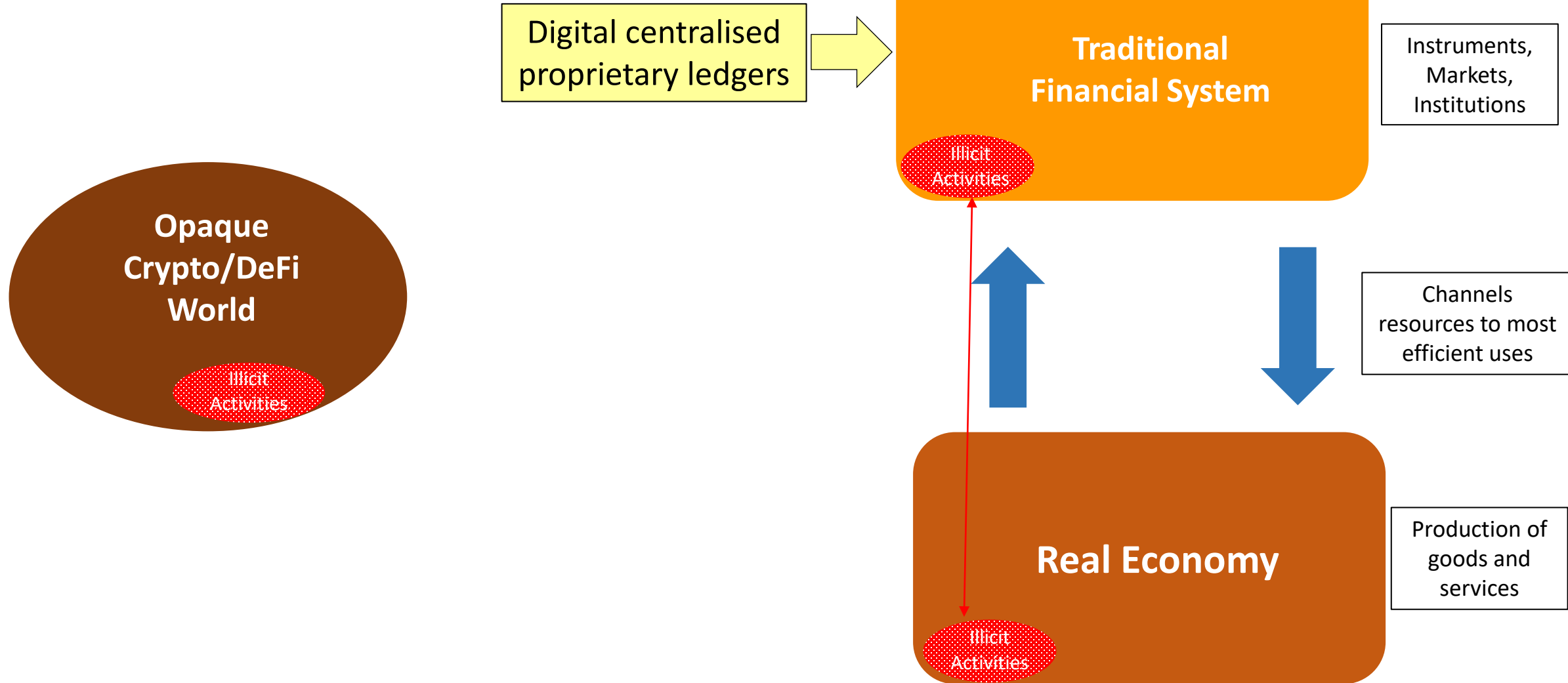
- Miners/Validators extract value by

- Choosing which transactions to include
- Re-ordering transactions
- Estimates for Ethereum Blockchain approach \$1 billion

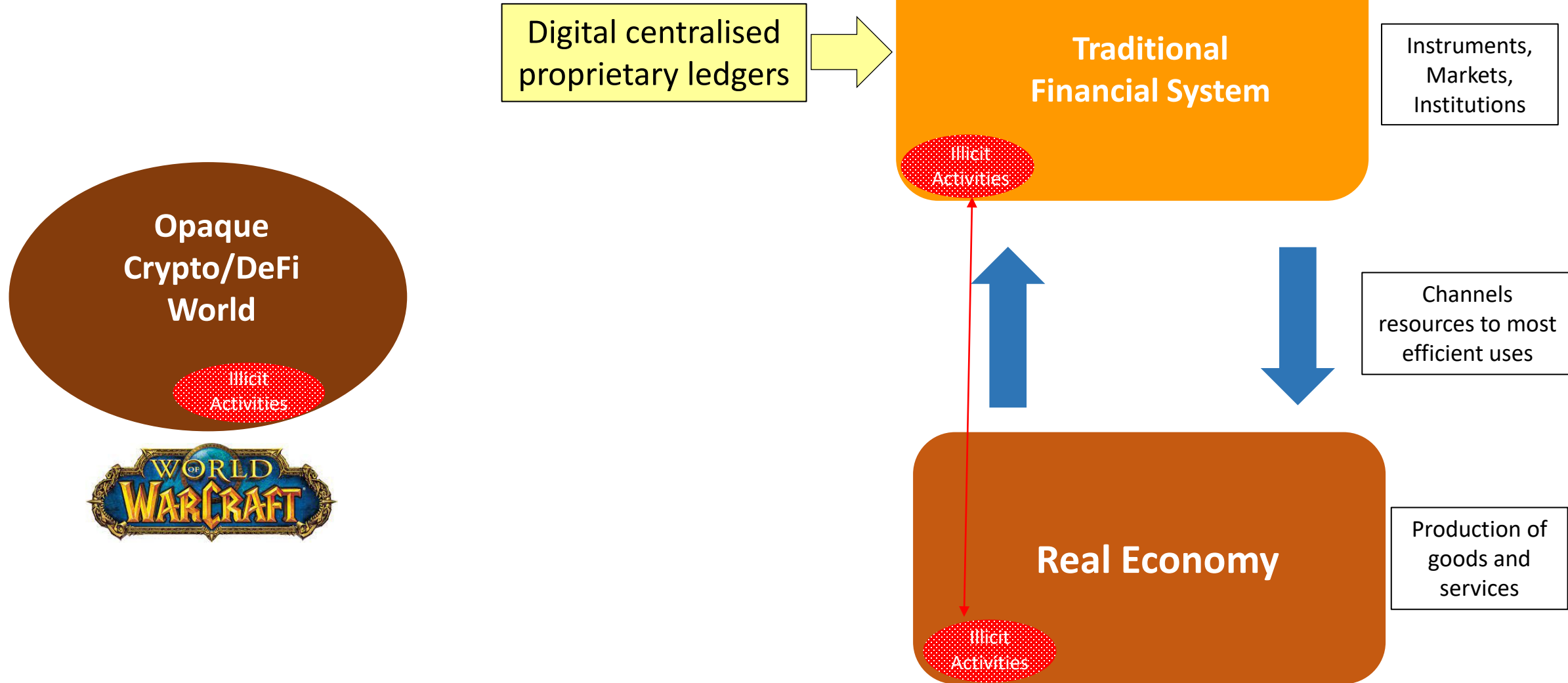


Design features of the system!

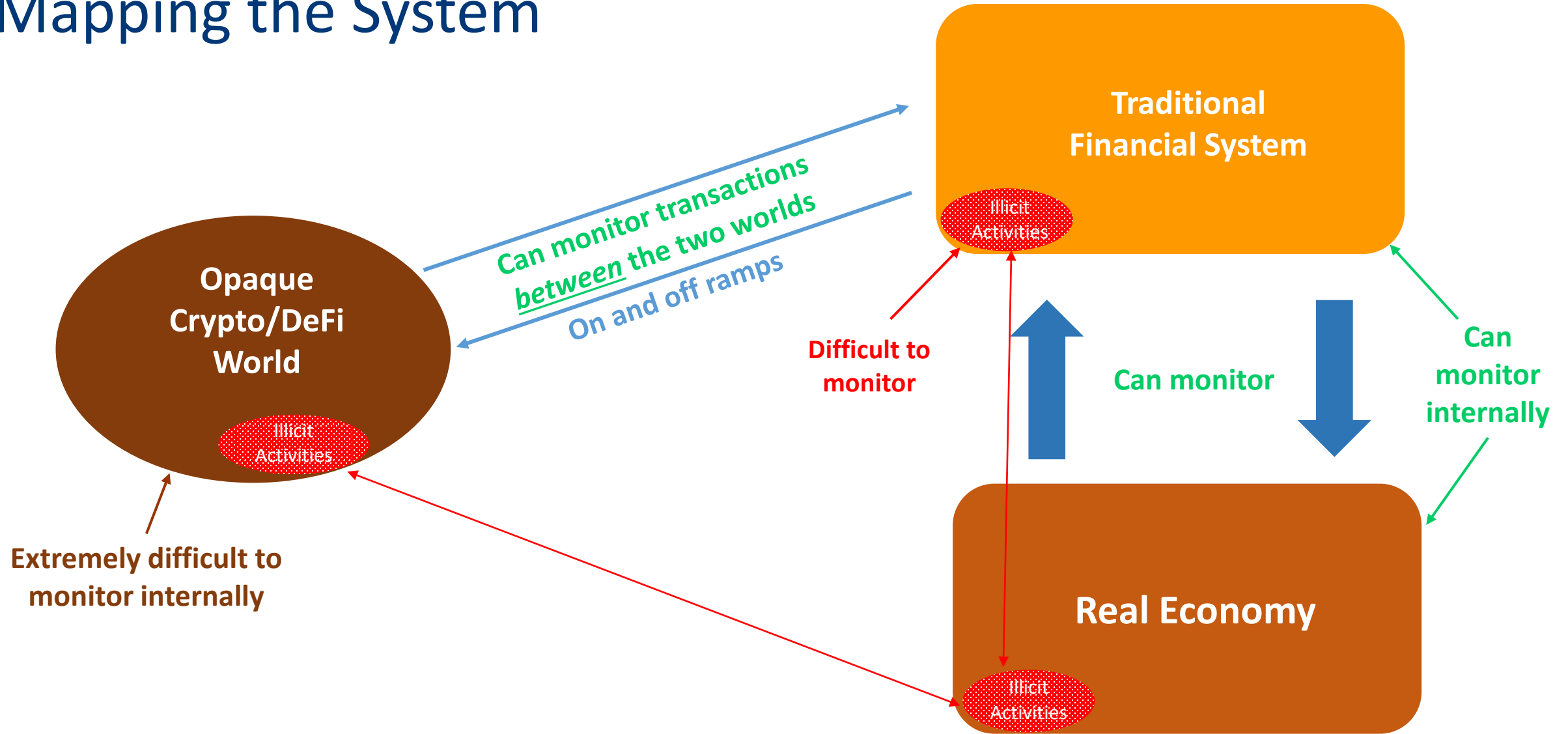
# Mapping the System



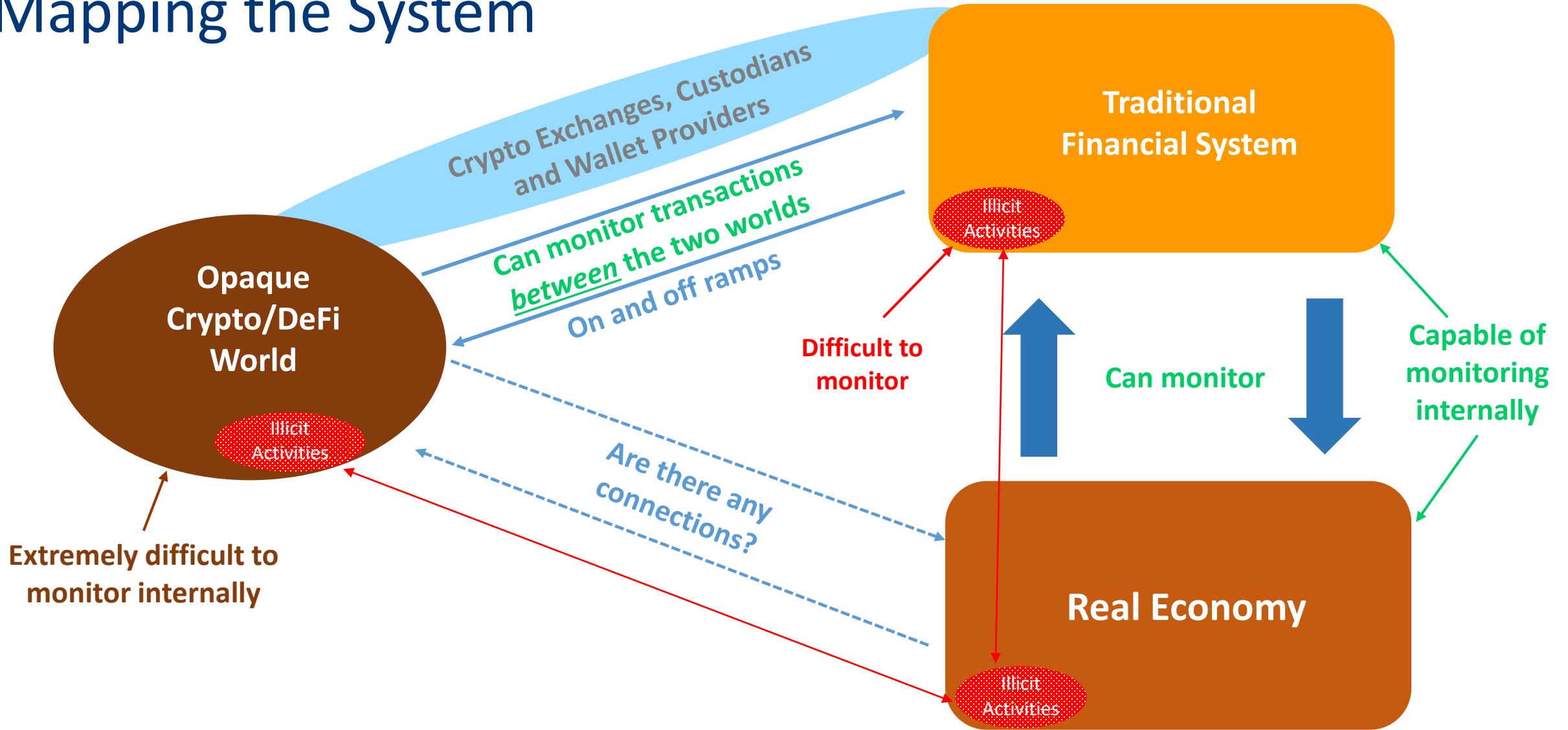
# Mapping the System



# Mapping the System



# Mapping the System





# Applying the Framework to Today's Crypto/DeFi World

Activity, Function or Service	Crypto/DeFi World
Payments system access	<b>Stablecoins</b> (primarily used for crypto transactions)
Lending and credit provision	<b>Smart contracts</b> execute in a nondiscretionary manner
Advising	<b>Algorithmic</b> through smart contracts
Safekeeping and accounting	<b>Ledgers, wallets and exchanges</b> provide custodial services.
Issuance of deposits and payment instruments	<b>Stablecoins</b> (reserve-backed and algorithmic)
Liquidity provision	<b>Flash loans</b>
Diversification and risk pooling	<b>Smart contracts</b> executes automatically
Financial market access and market making	<b>Crypto exchanges and non-custodial wallets</b>
Derivatives-based risk transfer	<b>Smart contracts</b>
Equity and debt underwriting	<b>Smart contracts &amp; nonfungible tokens (NFTs)</b>
Collecting and processing information	<b>Smart contracts and “oracles”</b>

# Linkages and transmission mechanisms

- Exposure bridges

- Holds assets from one world and issues liabilities in another
- Entity owns an asset (is long) in one world and issues liability (is short) in another

- Examples:

- Traditional Financial System  $\Leftrightarrow$  Real Economy:

- Household owns a (real economy) home, issues a (traditional financial system) mortgage
- Firm has (real economy) plant and equipment, issues (traditional financial system) bonds or equity

- Traditional Financial System  $\Leftrightarrow$  Crypto/DeFi world:

- Stablecoin issuer owns (traditional financial system) bond, issues (crypto/DeFi) stablecoin
- Asset manager owns crypto/DeFi asset, issues (traditional financial system) fund shares

# Challenges

- Mapping:
  - Crypto/DeFi World  $\Leftrightarrow$  Traditional Financial System (instruments, markets, institutions)
  - Crypto/DeFi World  $\Leftrightarrow$  Real Economy (production of goods & services)
- Monitoring:
  - Crypto/DeFi World is opaque without a distinct location
  - Reporting requirements may be difficult to enforce
  - Shape-shifter that may change form quickly and unpredictably
- Creating and enforcing effective regulation:
  - Formulating conduct rules for *code*
  - Identify targets of enforcement (miners/validators?)
  - Use fiat on- and off-ramps connecting the Crypto/DeFi and Traditional Worlds

# A few references

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