Digital Assets, Blockchain & Tokenization - Chances and Opportunities in Asset Management

PwC Investmentforum
29 September 2022

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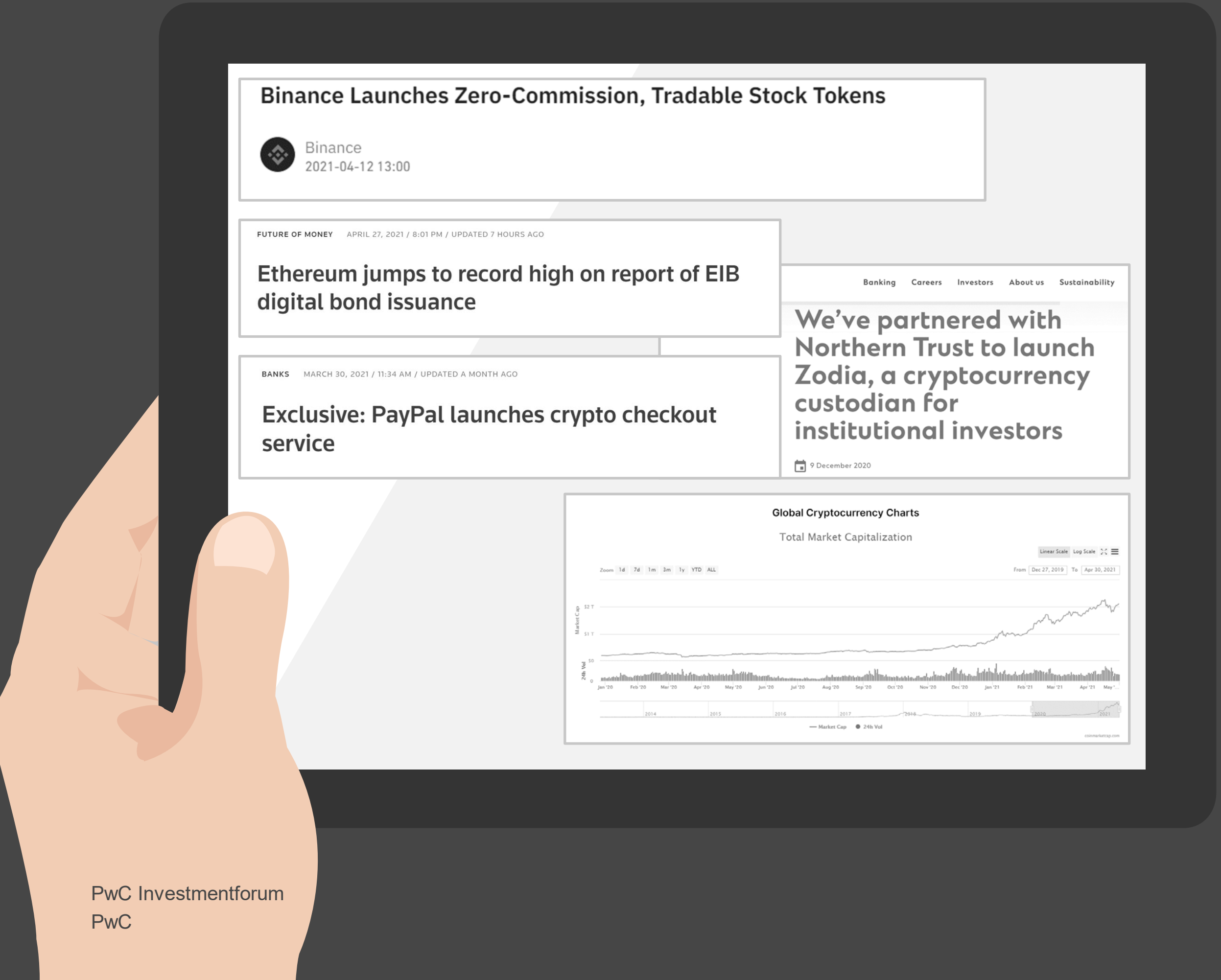
Digital Assets & Tokenization - Basic Concepts

Digital assets – The time to act is now


Binance Launches Zero-Commission, Tradable Stock Tokens

Binance
2021-04-12 13:00

FUTURE OF MONEY APRIL 27, 2021 / 8:01 PM / UPDATED 7 HOURS AGO

Ethereum jumps to record high on report of EIB digital bond issuance

BANKS MARCH 30, 2021 / 11:34 AM / UPDATED A MONTH AGO

Exclusive: PayPal launches crypto checkout service

We've partnered with Northern Trust to launch Zodia, a cryptocurrency custodian for institutional investors

9 December 2020

1 Adoption by consumers, industry & regulators

Innovative and efficient platforms are emerging for managing finances and asset holdings. Crypto is part of the "way of doing things" for the younger generation, and various industries are increasingly connecting with the ecosystem, as well as regulators increasingly covering digital assets

2 Emerging "reverse competition"

Aggressive, profitable and innovative new players are entering traditional banking businesses with digital and highly efficient value propositions such as tokenized securities

3 Attractive solutions for digitization

Smart contracts, asset tokenization and digital identities offer new platforms for the digitization strategy. As many institutions are transitioning towards a target state architecture, distributed ledger technology and digital assets need to be part of this

4 Need to build knowledge, experience and relationships

Distributed ledger technology and digital assets are a novel space for banks and regulators alike. Early and focused entry provides the opportunity to build incremental value streams that are sustainable and subject to the right governance

Understanding digital assets – thinking beyond Bitcoin and BAYC

Examples	Characteristics
	• “Classic” bitcoin-based blockchains • Resource-intensive PoW-base consensus • Poor base layer scalability
	• Different DLT architectures with novel features such as smart contracts • More efficient consensus mechanisms but remaining scalability challenges • Innovative token economics
	• Beyond blockchain – use of directed acyclic graphs • Higher scalability and less resource intensive • Some protocols include feeless transactions

Digital assets can be defined as a representation of any kind of asset on a distributed ledger. The underlying technology is enabling the emergence of new economies and is disrupting existing business models in financial services. Some important concepts include the following:

- **Digital tokens:** Tokens are native to a specific distributed ledger. They are not merely a currency, but can represent different kinds of assets as long as the underlying DLT protocol offers that capability
- **Smart contracts:** Smart contracts offer capabilities to automatically execute actions if specific conditions are met. This enables new ways of doing business, such as fully automated asset servicing or management of margining
- **Consensus:** Algorithmic approach to approving a specific transaction, removing the need for an intermediary. Different algorithms exist to achieve consensus while also offering security to the network
- **Fees/token economics:** Incentive structures to entice actors within a specific DLT network to fulfil their functions. While most DLTs require a fee to be paid for a transaction, there are individual projects enabling feeless exchange of data and value
- **Permissioned versus permissionless:** More than 2000 open-source DLT projects exist, offering permissionless access to the underlying network. Permissioned projects are centrally controlled developments, either by industry consortia or for-profit corporates

Understanding tokenization - how to define it?

Tokenization is the process of issuing or converting an asset into a digital form that is stored on and transferred through blockchain infrastructure (DLT):

- Lies between traditional finance and decentralized finance
- Enables automation of low-value and expensive operations in security offerings
- Value can be transferred in a secure and efficient manner as compared to traditional finance
- Identified stakeholders are represented on the blockchain infrastructure and market rules and regulations are adhered to

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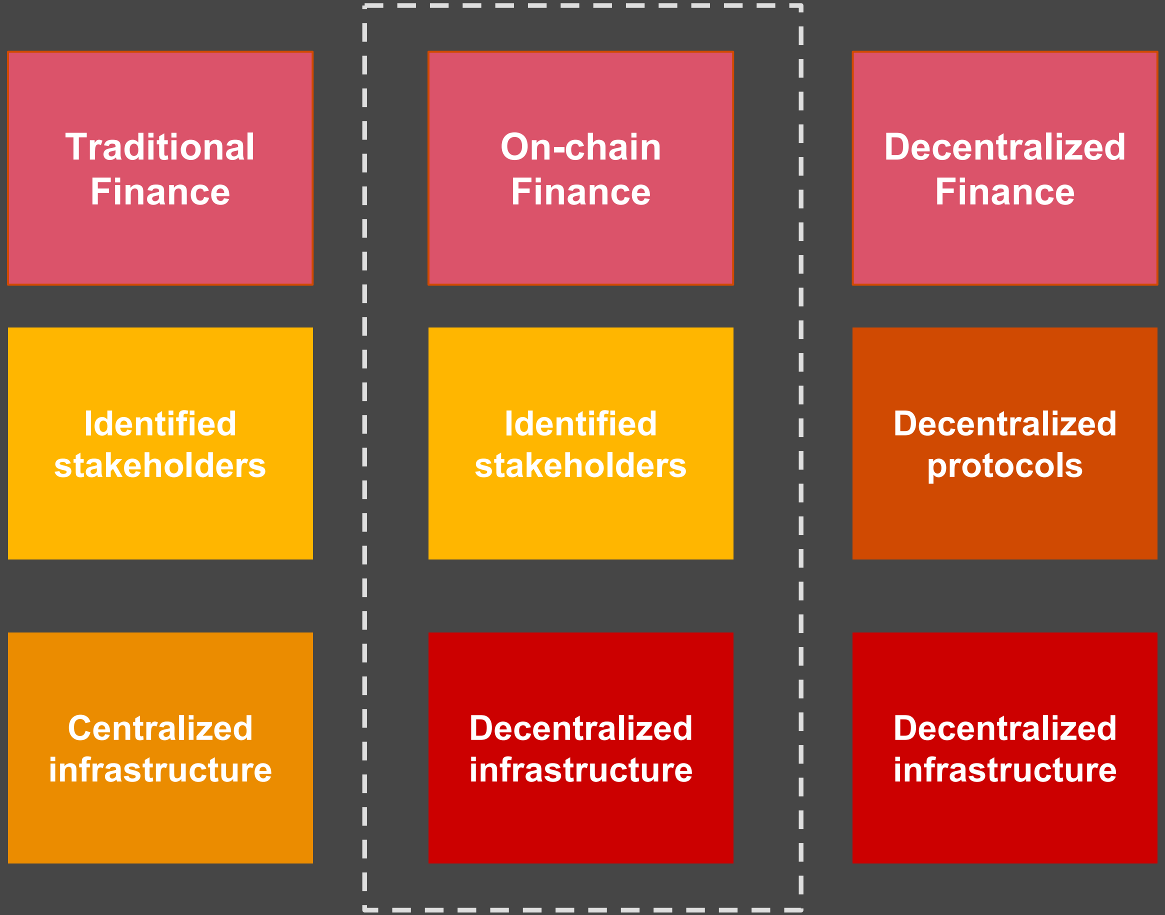


Traditional Finance	On-chain Finance	Decentralized Finance
Identified stakeholders	Identified stakeholders	Decentralized protocols
Centralized infrastructure	Decentralized infrastructure	Decentralized infrastructure

Several core benefits and challenges are identified for tokenization

Benefits

Liquidity	• Greater pool of investors due to easier access • Easier sale into secondary market
Sustainability	• Smaller carbon footprint compared to legacy systems • Easier monitoring of ESG targets
Transaction efficiency	• Lower overall transaction costs • Faster transaction processing • Higher informational symmetries
Transparency	• Documentation on public ledger • Immutability of information
Strategy	• Transformability of assets based on Web3 • Integration of oracles and smart contracts unlock new opportunities to capture and process data

Challenges

Regulatory uncertainties	• Ambiguous regulation depending on use case • Experience with supervisors required
Technical challenges	• Lack of infrastructure (Smart Contract Risks) • Lack in expertise and skills
Market risks	• High volatility due to an immature market
Awareness & acceptance	• Often difficult to understand and linked to risks • Executives and managers are unaware of the benefits and use cases
Immature	• Liquidity risk could lead to initially unattractive investments • Adequate platforms are missing

Tokenization’s greatest cost benefits are indirectly gained

Cost benefits for non-financial corporates

- Lower cost of capital
- Less regulatory expenses
- More efficient asset management
- Greater liquidity

Cost benefits for investors

- Easier access to investments
- Higher return alternative assets
- More diversification
- Lower risk

Cost benefits for financial institutions

- Freeing up capital
- Risk reduction
- Greater access of clients and investors
- Lower risk involved

		Traditional Securitization	Tokenization
Direct Costs	Legal	▲	▼
	Automation	-	▼
	Time	▼	▲
	Compliance	▼	▲
	Custodial	▼	▲
	Administrative/Accounting	▼	▲
Indirect Costs	Liquidity	▲	▲ ▲
	Transparency & Monitoring	▼	▲ ▲
	Global Investor Pool	▲	▲ ▲
	Security	▲	▲ ▲
	Brand Awareness	-	▲ ▲
	Fractionalization	▼	▲ ▲

Legend	▲ Positive cost benefits	▼ Negative cost benefits

Real estate poses a promising asset class for tokenization

- Rising interest rates increase the cost of capital making the funding of new and existing projects more difficult
- Tightening of consumer markets lead to lower liquidity, pushing real estate prices downwards
- High transaction costs related to intransparency, commission fees, opportunity costs are a continuous challenge for real estate markets
- Of $ 7.1 trillion in commercial EU real estate, approx 9.4% are traded as (non-)REITs*, indicating a major Tokenization potential for an illiquid market

* source: EPRA

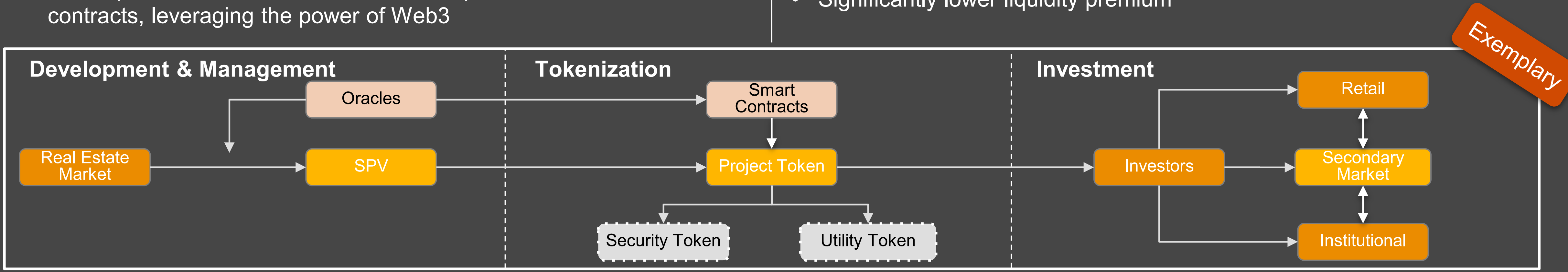
Potential benefits of real estate tokenization

Development & Management

- Tokenization enables developers to access wider range of investors, due to lower entry barriers
- Blockchain frameworks allow a higher number of transfers without increasing organizational burden
- The implementation of oracles enables sophistication of smart contracts, leveraging the power of Web3

Investment

- Access real estate returns without minimum investment thresholds
- Transfers of ownerships stakes at significantly lower transaction costs
- Access to data which is documented on the distributed ledger, decreasing asymmetric information
- Significantly lower liquidity premium


Exemplary
Development & Management
Oracles
Real Estate Market
SPV
Tokenization
Smart Contracts
Project Token
Security Token
Utility Token
Investment
Retail
Investors
Secondary Market
Institutional

Our Tokenization framework covers the end-to-end requirements for achieving successful tokenization projects

Financial & TAX	Transaction Infrastructure	Bank Account			Settlement		Brokerage
	Wallet Setup	TAX Perspective					
Risk & Legal	Howey Test	Choose Jurisdiction to operate in	Compliance & Risk Framework	Fulfill specific regulatory & compliance boundaries	GDPR		
					TAX		
	Legal Entity				Client Onboarding DD, AML & Travel Rule		
Business & Marketing	Identify purpose and motivation	Community/Investor Evaluation	Whitepaper	Community Channels	Chose Exchanges	Community Development	After-Market analysis
	Determine & define underlying value	Business model evaluation	Website and Social Media	Community Management	Investor Relations		
		Marketing Strategy	Setup Q&A	opt. Collectables Airdrop			
Technology	Smart Contract standards	Functional Token Design	Token Implementation	Development	Testnet Phase	Transition to Mainnet	
	Technical Framework	Governance model	Layer 2 Considerations	Security Review	Smart Contract Review	Key-Handling	
	Preparation Phase			Pre-Listing Phase		Listing Phase	

*generic approach need to be adapted to the concrete scope

Key messages for Digital Assets & Tokenization

1. Digital Assets are disrupting the FS industry
2. Different DLT protocols for different use cases
3. Tokenization as „on-chain finance“
4. Different types of token currently discussed
5. Estimated STO market cap of $15trn in 2025
6. Real estate will be one of the first asset classes to benefit from the power of DLT
7. A sophisticated framework is required for a seamless implementation of DLT-solutions

2

Regulatory framework

Going mainstream – Emerging legal and regulatory frameworks to enter the market

Jan 2009

Initial release of Bitcoin

Dec 2011

BaFin qualified **Bitcoins**/crypto currencies **as financial instruments** (units of account)
→ Transactions involving payment tokens may qualify as banking/financial services which require a **BaFin-license**

Oct 2017

First **ICO** in Germany (Wysker)

Feb 2018

1st BaFin statement on ICOs

- Same business, same risks, same rules
- **Supervisory law is technology-neutral** (ESMA: "Substance over Form")
- Focus of regulation is on the actual service of the individual use case → The specific individual case thus decides on the regulatory assessment of a crypto token-based business model

Sept 2018

Regional Criminal Court of Berlin (*Kammergericht*)

- *Bitcoin lacks the general acceptance as a currency and therefore cannot be compared with the financial instruments*

But **"only" a criminal court ruling with no influence to financial supervisory law**; not binding for BaFin

Jan 2019

First **STO** in Germany (Bitbond)

- Based on tokenised participation right (*Genussrecht*) due to paper note requirement for bearer bonds

Jun 2019

Libra announcement
→ Discussions on stablecoins and CBDC

Aug 2019

2nd BaFin statement on ICOs

- Details on qualification as security vs. capital investment

Sep 2019

Blockchain Strategy of the German Government

Stability and innovation through blockchain in the financial sector by

- opening German law to electronic securities
- publishing a bill to regulate the public offering of certain crypto tokens
- creating legal certainty for trading platforms and crypto custodians
- working on a European and international level to ensure that stable coins do not become an alternative to state currencies

Jan 2020

BaFin-license requirement for crypto custodian service
and crypto asset as new definition of financial instrument under German Banking Act

- License requirement "sneaked" in with AMLD 5
- Not in other EU member states

→ No passporting

- Only custodian service (wallet)

→ No one-fits-all BaFin-license for crypto business models

Mar 2020

BaFin statement on crypto custodian service

Aug 2020

Draft law on the introduction of electronic securities (eWpG)

- Limited to bearer bonds; no stocks or fund units, but to be expected in "near" future
- Differentiation between electronic "classic" securities (no deed) and crypto securities (blockchain as register)
- Introduction of an electronic securities register and crypto securities register

Sep 2020

MiCAR: EU Commission – crypto regulation proposal

- Harmonized crypto regulation for the EU, including passporting of licenses
- Directly applicable in each EU member state
- To be implemented by end of 2022
- 5 yrs. pilot regime allows exemptions from regulatory requirements that enable the testing of DLT solutions (sandboxing)

Oct 2020

- ECB - Central Bank Digital Currency (CBDC) proposal
- Evaluation of CBDC benefits and challenges

Jun 2021

Electronic Securities Act in force (eWpG)

- Introduces Electronic and crypto bearer bonds; and
- electronic fund units (no deed)
- Crypto fund units to follow in short

Jul 2021

Fund Location Act in force

- Allows investments in crypto assets for special AIF

Sep 2021

Draft regulation on KryptoFAV

- Allows distribution of crypto fund units via crypto register

Regulators setting the frame for a fully regulated crypto market

New BaFin approvals

Enter regulation

- STOs are based on an approved BaFin-prospectus – other than ICOs
- Explicit crypto asset definition in German Banking Act (KWG) – no workaround needed
- New BaFin-license for crypto custodians – pilot regulation in EU

Start of digital securities (eWPG)

New legal options

- Electronic and crypto bearer bonds; and electronic fund units (no deed) □ crypto stocks as next step
- No global certificate ("Globalurkunde") at CSD required anymore

Upcoming MiCAR

Start harmonization

- Harmonized crypto regulation for the EU
- Directly applicable in each EU member state
- To be implemented by end of 2022
- EU passporting included to start EU-wide operations under the license in one member state

Opening investment law

Enable crypto funds

Change of Investment Act (KAGB) by Fund Location Act (Fondsstandortgesetz)

- List of possible investments for special AIFs extended by crytro assets
- Allows investments in crypto assets up to 20% of fund volume

Future CBDCs

Close payment gap

- Future Central Bank Digital Currency (CBDC) will allow fiat payments within the blockchain structure
- A digital Euro would constitute the keystone of a fully digital capital markets infrastructure

Draft of KryptoFAV

Allows crypto register

- Issues of securities based on a DLT infrastructure
- Enables fund shares to be distributed as tokens (possible advantages in issuance and trading)
- Crypto register must be maintained by custodian

Key messages on the regulatory framework

1. Increasing speed in the development of new products and their regulation shows: It’s time to act now!
2. Current regulatory framework is rather national and divers
3. EU harmonization to be expected within the next 2-3 years
4. Early regulation in Germany allows for gaining experience with regulated crypto business as good starting point for a later EU-rollout under MiCAR

3

Fund issuance

Regulatory Background

Distribution of crypto fund units (“tokens”) via crypto register is now possible

Tokenization of Fund Units in Germany:

Bearer bonds, digital stocks and funds shares can be issued without the need of a dedicated deed (‘Urkundenerfordernis’). The recently amended legislative framework in Germany (eWPG, KryptoFAV) foresees two options for the issuance of digital securities:

Central register (CSD)

- Global certificate (“Globalurkunde”) at CSD not required (paperless version of existing process)
- Electronic central register for fund units at CSD is possible

Decentral register (crypto register)[1]

- Without CSD
- Based on a DLT infrastructure
- Crypto register must be maintained by custodian
- Fund shares can be distributed as tokens (possible advantages in issuance and trading)

Excursion Luxembourg:

- The legal framework in Luxembourg grants transactions conducted on the blockchain the same legal status as traditional execution.
- Digital fund distribution via tokens on a blockchain is hence possible in principle
- Due to the lack of an overarching regulation a number of practical questions (e.g. role of transfer agents) remains unresolved

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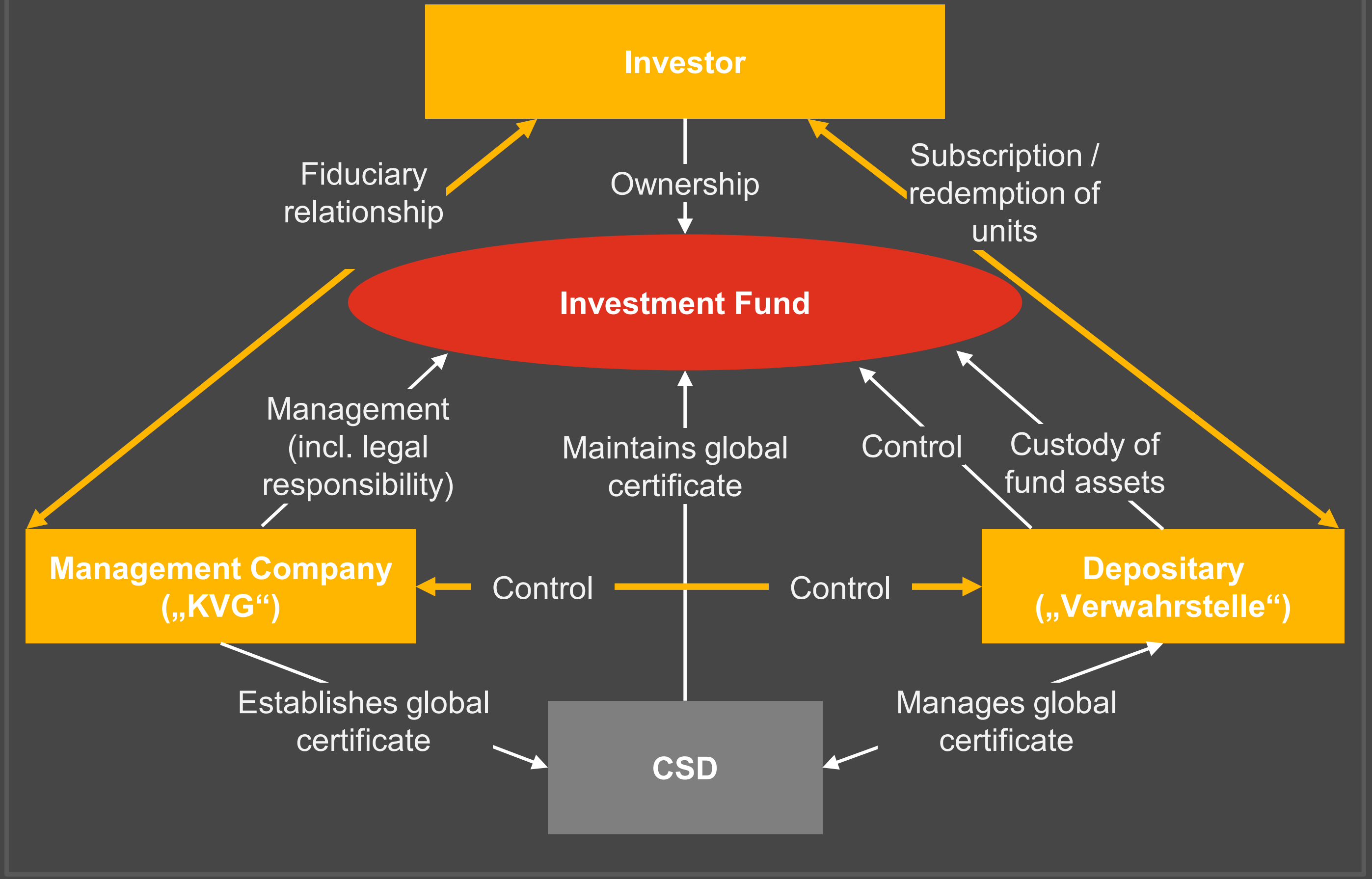
[1] Made possible by „Verordnung über Kryptofonds-Anteile (KryptoFAV)“, September 2021

Stakeholders in the fund issuance process

To reduce overall complexity we shall discuss the tokenization of an institutional fund

Investment Triangle



Investor
Fiduciary relationship
Ownership
Subscription / redemption of units
Investment Fund
Management (incl. legal responsibility)
Maintains global certificate
Control
Custody of fund assets
Management Company („KVG“)
Control
Control
Depositary („Verwahrstelle“)
Establishes global certificate
CSD
Manages global certificate

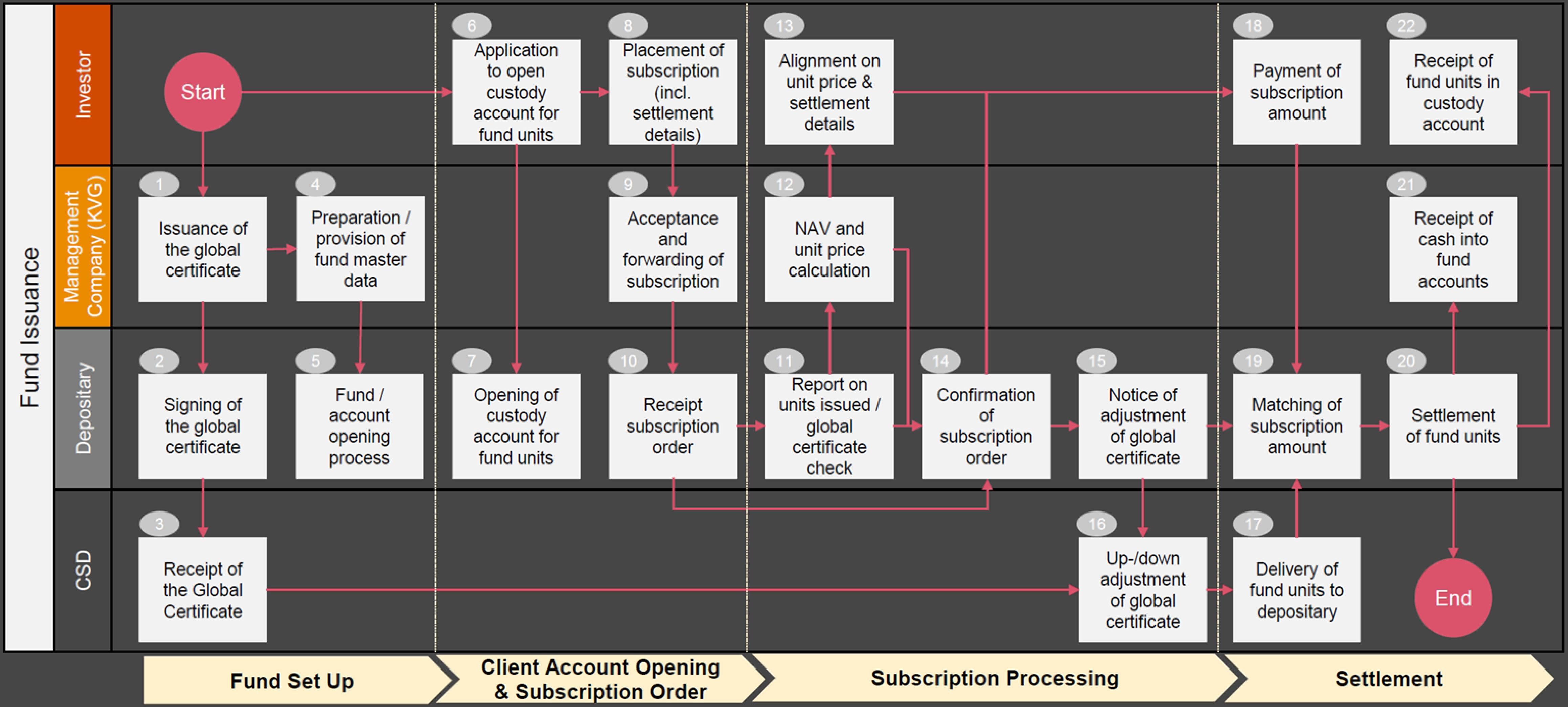
Peculiarities of Institutional Funds

1. **Tri-party agreement** between management company, investor and depositary constitutes the investment fund. (Retail funds: Fund prospectus).
2. For sake of simplicity, the investor shall hold the **fund units in custody at the depositary** (no intermediaries). (Retail funds: Client bank, fund platform)
3. **Subscriptions / redemptions are on a discretionary basis.** (Retail funds: Daily capital flows)
4. **Single large fund orders on amount basis.** (Retail funds: Multiple small orders generally on unit basis)

Current issuance process of institutional fund units

Starting point: Tri-party agreement has been concluded

- illustrative-



Fund Issuance

Investor

Management Company (KVG)

Depositary

CSD

Start

1 Issuance of the global certificate

2 Signing of the global certificate

3 Receipt of the Global Certificate

4 Preparation / provision of fund master data

5 Fund / account opening process

6 Application to open custody account for fund units

7 Opening of custody account for fund units

8 Placement of subscription (incl. settlement details)

9 Acceptance and forwarding of subscription

10 Receipt subscription order

11 Report on units issued / global certificate check

12 NAV and unit price calculation

13 Alignment on unit price & settlement details

14 Confirmation of subscription order

15 Notice of adjustment of global certificate

16 Up-/down adjustment of global certificate

17 Delivery of fund units to depositary

18 Payment of subscription amount

19 Matching of subscription amount

20 Settlement of fund units

21 Receipt of cash into fund accounts

22 Receipt of fund units in custody account

End

Fund Set Up

Client Account Opening & Subscription Order

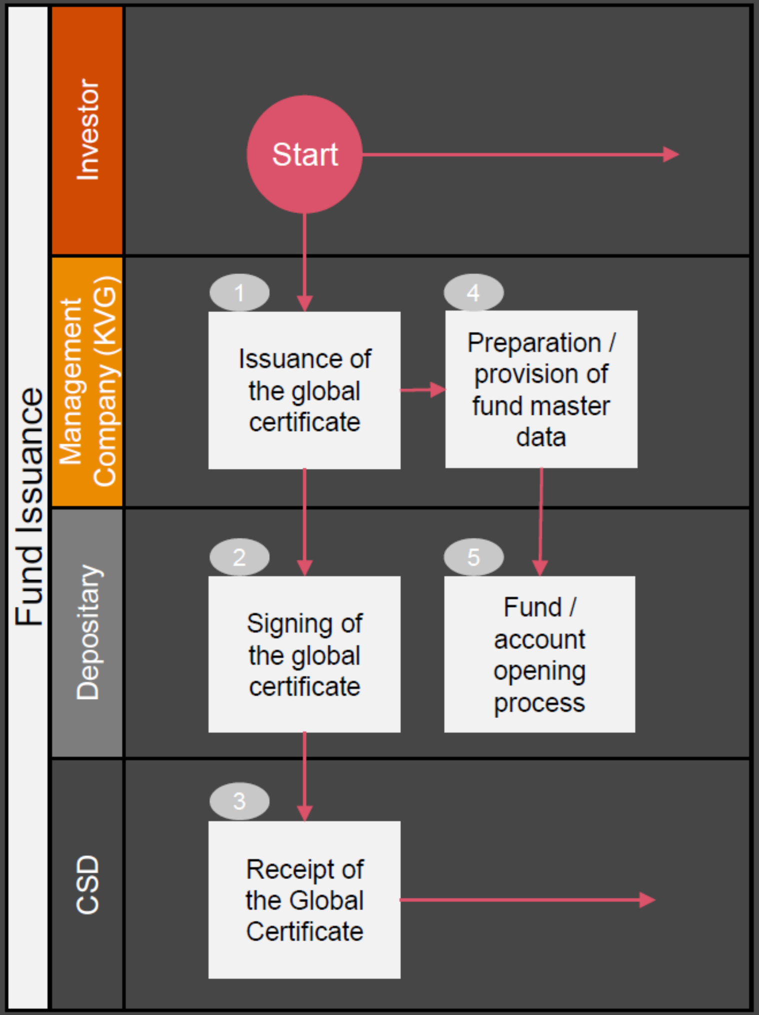
Subscription Processing

Settlement

Fund Set-Up

Ensuring operational readiness

- illustrative-


Fund Issuance
Investor
Management Company (KVG)
Depositary
CSD
Start
1
Issuance of the global certificate
4
Preparation / provision of fund master data
2
Signing of the global certificate
5
Fund / account opening process
3
Receipt of the Global Certificate

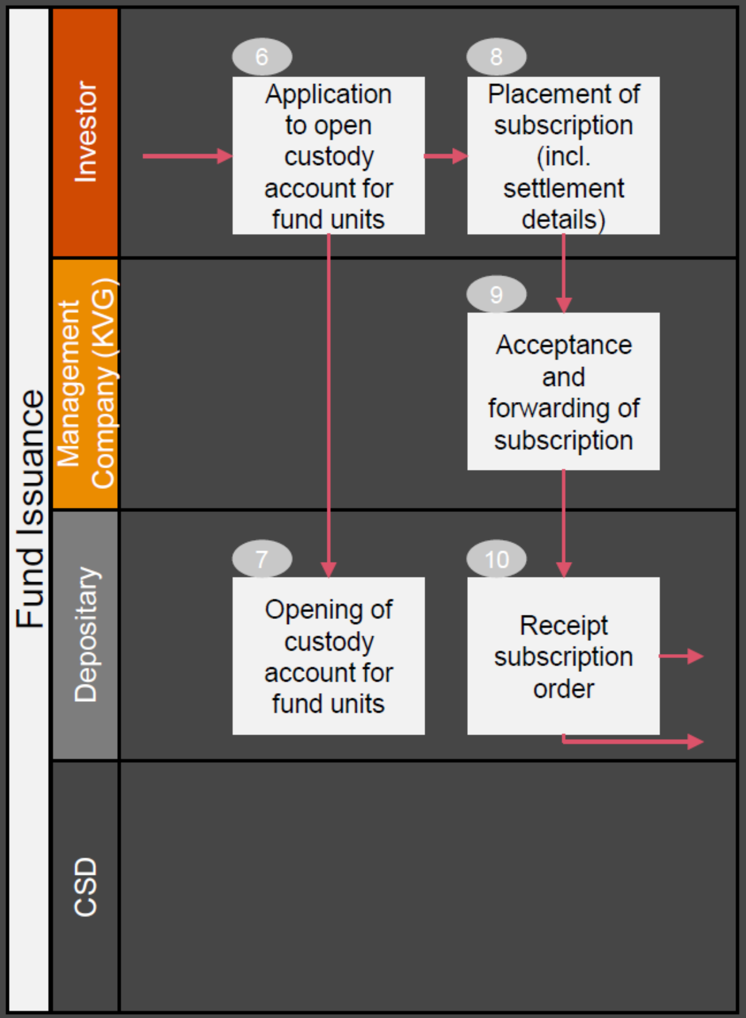
Potential Implications DLT / Tokenization

- No more need for global certificate; deploy smart contracts instead?
- Two main use cases for DLT:
  - AML / KYC on permissioned blockchain → creation of digital ID; automatically available to involved parties and linked to issuance process.
  - Contract management → one source of truth, directly fed in DLT issuance process
- What type of blockchain is appropriate (private/ public, permissioned/ permissionless)? What is the center of evidence?
  - Public: concerns: bad actors, confidentiality
  - Private: who runs the blockchain? Depositary, ManCo? Need to connect multiple custodians? Privacy concerns (transaction history; GDPR for retail investors)
  - Interoperability of private/ public blockchains
- General advantage of DLT: one shared truth among parties (DLT is broader than blockchain)

Client Account Opening & Subscription Order

Integration of client facing activities

- illustrative-



Fund Issuance

Investor

Management Company (KVG)

Depositary

CSD

6 Application to open custody account for fund units

7 Opening of custody account for fund units

8 Placement of subscription (incl. settlement details)

9 Acceptance and forwarding of subscription

10 Receipt subscription order

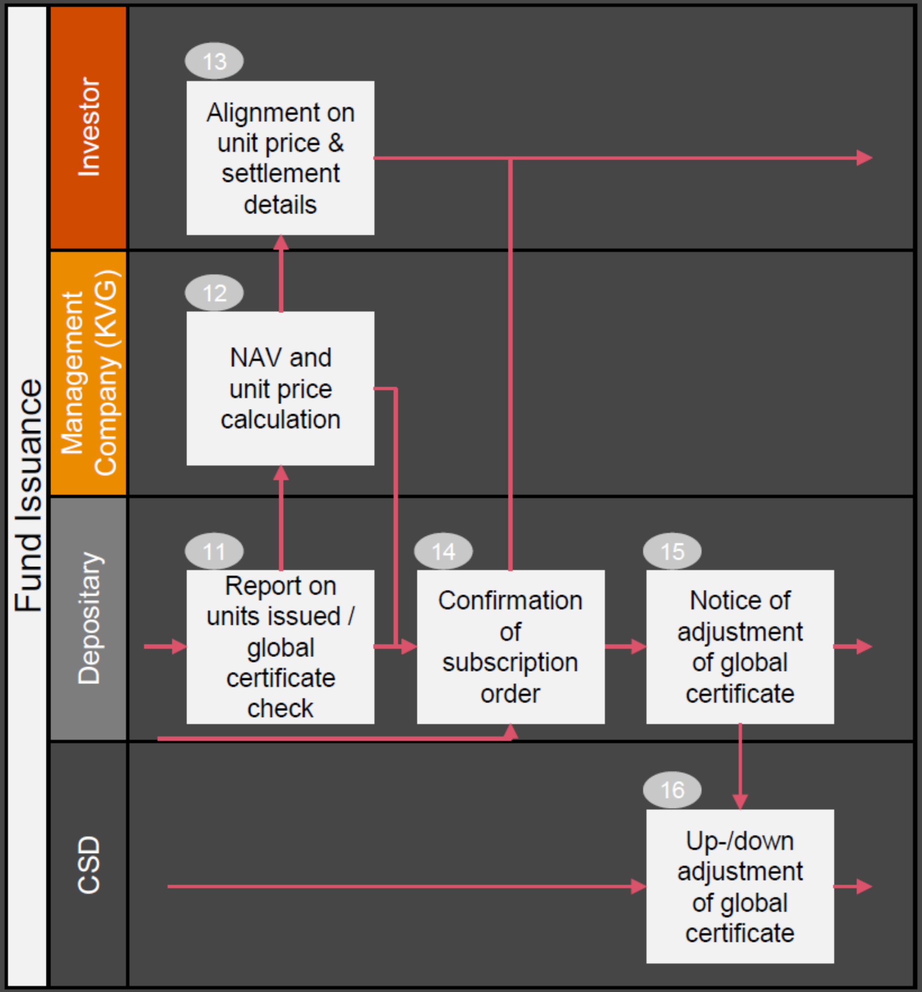
Potential Implications DLT / Tokenization

- Will investors need a custody account for fund units? A ManCo wallet could hold crypto assets and tokens for clients → potential to replace custody accounts
- Type of blockchain impacts wallet requirements
- Eligibility criteria for customers for wallet service → safeguard mechanisms through use of smart contracts
- What is the onboarding process - and what are the requirements for a ManCo client wallet?
- Privacy concerns regarding observability of transaction history
- Is wallet required? Fund register on blockchain (enhanced privacy: omnibus account of bank)
- Ultimate setup yet to be determined → permissioned public blockchain could be appropriate for ManCo

Subscription Processing

Executing the client order

- illustrative-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Confirmation of subscription order
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Notice of adjustment of global certificate
16
Up-/down adjustment of global certificate

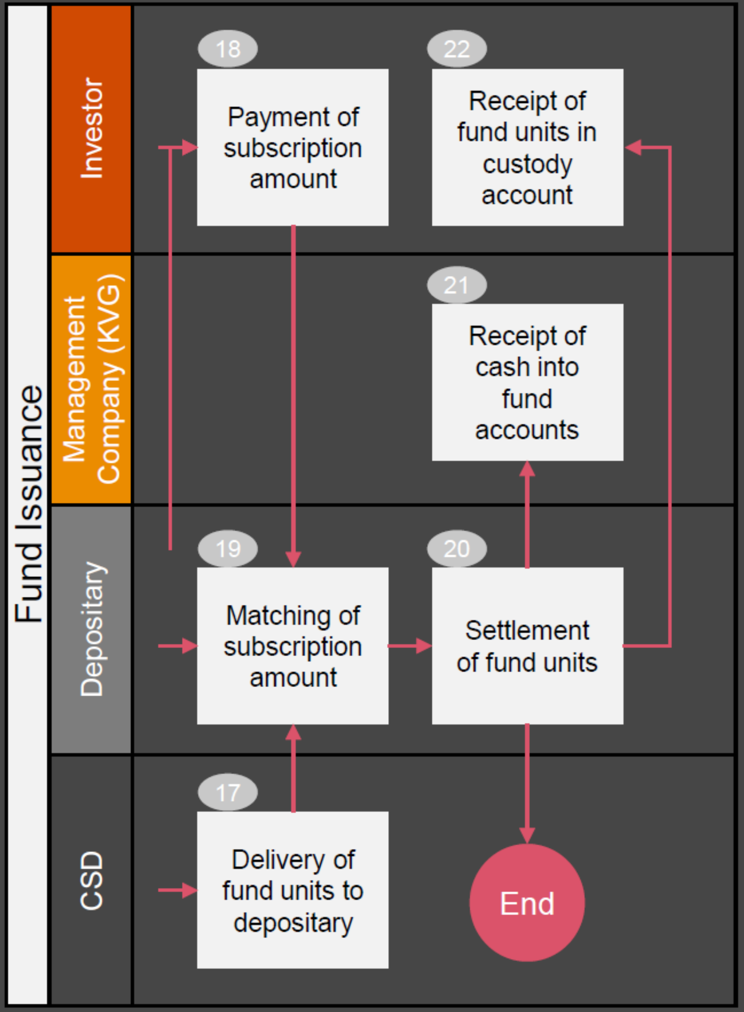
Potential Implications DLT / Tokenization

- “Unit” could be any number of tokens; even fractionalized tokens/ shares possible
- Fractionalized ownership possible for (il)liquid assets
- Possible reduction of settlement cycle to T+0 (potential “real-time NAV” in far future)
- Limited impact on fund accounting in current scenario
- Inclusion of tokens into fund accounting?
- Balance sheet of funds could evolve → further breakout sessions required for deep dive

Settlement

Matching cash and fund unit bookings

- illustrative-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Payment of subscription amount
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Receipt of fund units in custody account
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Receipt of cash into fund accounts
19
Matching of subscription amount
20
Settlement of fund units
17
Delivery of fund units to depositary
End

Potential Implications DLT / Tokenization

- Different settlement cycle in fiat vs. digital currency (CBDC)
- If subscription happens in smart contract: all steps could be triggered automatically (DvP with CBDC; however could still work with fiat currency)
- How to handle payment lag? Potential use of utility coin on chain for settlement → hybrid solution in absence of CBDC (which could further shorten and smooth process)
- What are building blocks for infrastructure? → Stablecoin, DLT protocol, right combination of artefacts, privacy and security
- Switch between funds could be triggered automatically and avoid conversion risks & currency related fees
- Challenges of a company stablecoin: liquidity, scalability, limited use
- Investor bookkeeping: identification of investor, time of investment, etc. (omnibus accounts) → type of blockchain

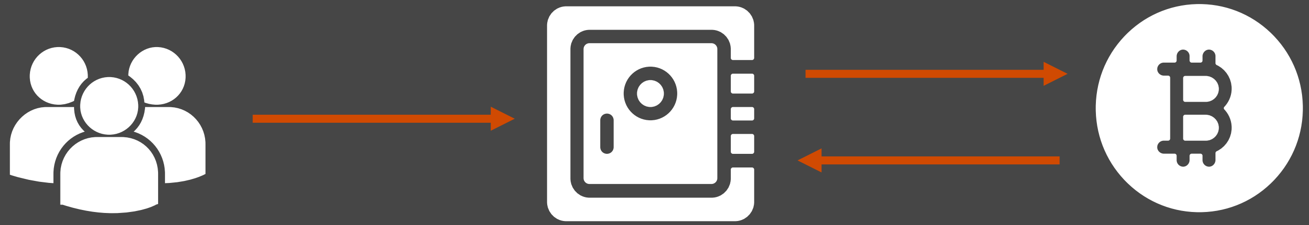
4

Custody of Crypto Assets

Crypto Custody - a new business model in the ecosystem

> «The ecosystem growth and the **massive adoption of crypto-assets** enabled **new operators** to offer services that allow institutional and private players to **access** and **operate** on the crypto market and to **safely keep** and use their funds»

Crypto custodians offer “wallet services” to customers using “hot” or “cold” storage of the private keys. Inside the wallet crypto assets can be stored and are accessible to the owner. In combination with a trading app, customers can buy, sell and store crypto assets and trade crypto against crypto.



Customers & Institutionals

Custody Service

Crypto Market

To ensure the **efficiency** and **safety** of the crypto-asset transfer and storage processes, new **financial institutions** can enter the market to **establish a communication channel** between the world of trusted traditional investors and the crypto-assets market.

A secure key management is crucial for crypto custody

It is essential to understand the importance of managing the cryptographic keys that allow to access and dispose of the funds.

‘Your Keys, Your Asset’

A **private key determines the possession** of a crypto-asset. In general, the **management** of private keys **is quite complex**, as the responsibility lies entirely with the person in possession of the funds.

Risks

The **theft or loss of the private key** has irreversible consequences: it **means losing access to control** of the crypto-assets. A stolen key is equivalent to the theft of crypto-assets.

The risk associated with key management increases in proportion to the value of assets controlled by the private key

The importance of Crypto Custody services

The risk associated with the loss or theft of private keys requires the presence of **market operators able to offer a service that ensures reliability and security in key management**. The operators offer an end-to-end management service:

- **Creation of private keys** (during the first purchase or first transfer of funds)
- **Management and use of private keys** (to control and arrange funds)

Overview on new business models for crypto custody

Traditional market players

HAUCK & AUFHÄUSER

Issuance of HAIC Digital Asset Fund in 01/2021 (Special AIF based on KAGB) – Custody by Kapilendo Custodian AG[1)]

BNY MELLON

BNY is developing a client-facing prototype that is designed to be the industry's first multi-asset digital custody and administration platform for traditional and digital assets“[2)]

STATE STREET

State Street launches a new division dedicated to digital finance - State Street Digital will expand to include crypto, central bank digital currency, blockchain, and tokenization[3)]

New business models

Fidelity

Fidelity Digital Assets offers enterprise-grade custody and execution services for institutional investors[4)]

ANCHORAGE DIGITAL

Anchorage Digital Bank is an advanced digital asset platform, for secure crypto custody, trading, staking, governance for 45 cryptocurrencies[5)]

Fireblocks

Fireblocks is an all-in-one platform to store, transfer and issue digital assets across the ecosystem with currently >400 institutional clients and >$815bn transferred on their platform[6)]

Crypto custodians (GY)

Solaris Digital Assets

A white-labeled custody API integrates smoothly into the customers’ frontend, allowing to safely store customers’ digital assets at scale[7)]

TANGANY

German provider for custody of digital assets and crypto. It offers a reliable solution for crypto wallets and infrastructure to the most popular blockchains incl. custody for Bitcoin and Ethereum with >60.000 wallets under custody[8)]

Finoa

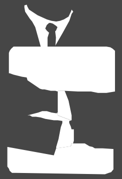
Finoa enables the full range of financial services for digital assets: custody, staking and trading, all-in-one platform[9)]

Meanwhile, BNY Mellon invested in Fireblocks, Nomura collaborated with Ledger[10)], Standard Chartered set up the custody joint venture Zodia with Northern Trust[11)] and invested in digital asset custody firm Metaco[12)]

Source: 1) Hauck & Aufhäuser; 2) BNY Mellon ; 3) State Street ; 4) Fidelity Digital Assets ; 5) Anchorage Digital ; 6) Fireblocks ; 7) Solaris Digital Assets ; 8) Tangany ; 9) Finoa ; 10) Ledger ; 11) Zodia ; 12) Metaco

Custody & Execution

Options for a strategic development



Services

- Fund issuance & distribution
- Fund administration and reporting
- Ramp-on / ramp-off on multiple trading venues
- Trading desk
- Dedicated customer service

Fund Manager

- Diversify the portfolio by investing in crypto-assets

1 Service Outsourcing

Go-to-market: short-term

Full outsourcing of the entire service to an external crypto custody provider and white-labeling of an existing solution

User connectivity
Processes & operations
DLT operations

2 Tech Outsourcing

Go-to-market: medium-term

Outsourcing of the technological components provided by an external crypto custody provider. Clients relationship and risks are fully managed by the asset manager.

User connectivity
Processes & operations
DLT operations

3 Internal Solution

Go-to-market: long-term

Internal development for the entire service, including the definition of business model and the development of custody technology.

User connectivity
Processes & operations
DLT operations

Q&A session

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