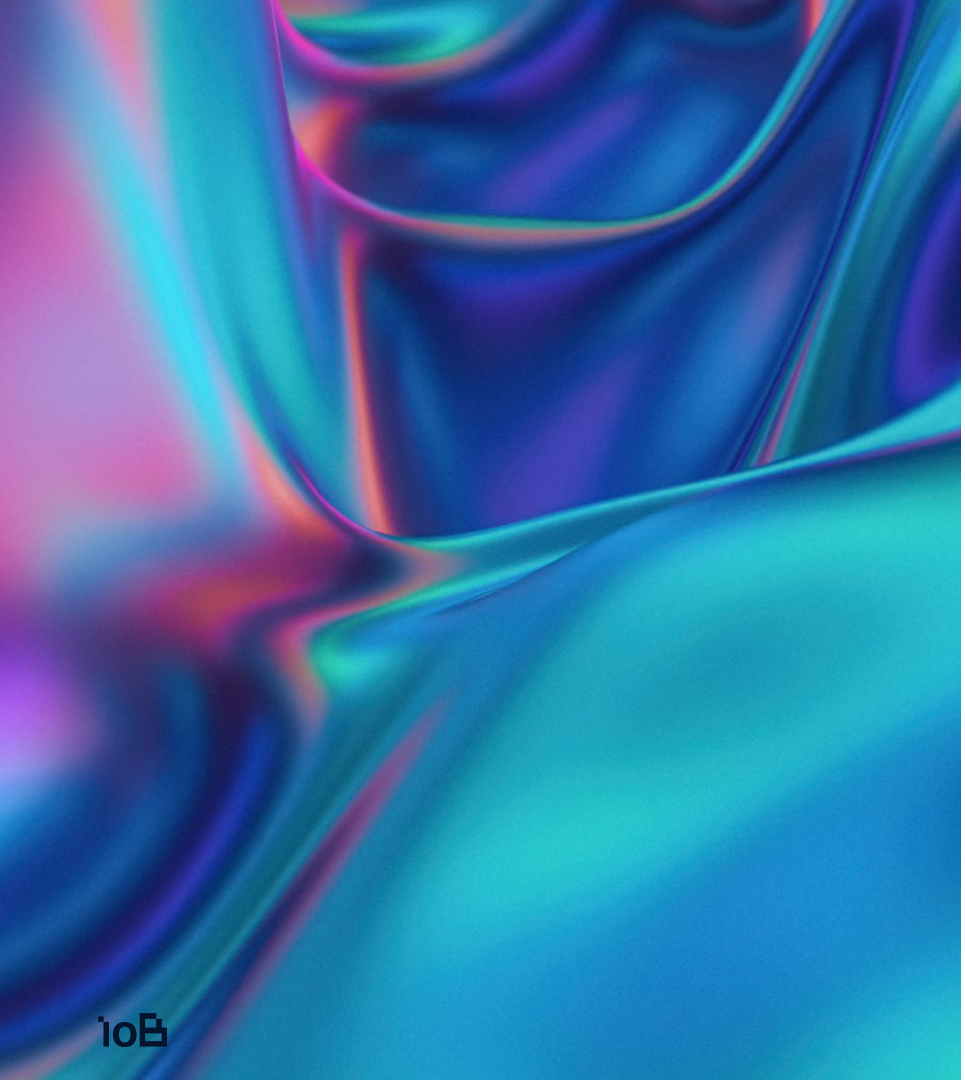
Hyperledger Webinar

Tokenization of Real World Assets (RWA)



Content

01

Who we are and what we do

Who we are

A Blockchain technology company

We are an institutionally-focused blockchain technology firm with deep experience building enterprise solutions based on distributed ledger technology. We understand business needs and accompany our partners in the process to unlock their potential.

We are a team that brings together enterprise architects, blockchain specialists, business and legal experts to partner with companies, enabling them to make a meaningful impact and succeed in their blockchain and DLT adoption.

We leverage our modular product suite offering tokenization services for financial, capital, and alternative markets.

ABOUT US

30+	50+	100+
CLIENTS WORLDWIDE	PROJECTS DELIVERED	EMPLOYEES

Value proposition

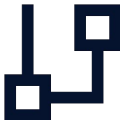
Enterprise blockchain experts

- Strong positioning and reputation in the blockchain enterprise sector at global level.
- Demonstrated delivery capacity in productive projects, not just PoCs.
- Innovation is embedded in our DNA, as we constantly explore new technologies and design tailor-made solutions for our clients.
- Our way of working is agile and collaborative, enabling us to quickly adapt to the changing needs of the market.
- Our values are transparency, collaboration and non-conformity. We build trust with our clients and people, creating long-lasting relationships based on mutual respect and shared success.

Business and regulatory compliance mindset

- Professional business, legal and product teams working together to create value-added use cases.
- Solutions that fit business needs and keep compliant with the changing regulations.
- We accompany every step of the way, ensuring a seamless and successful integration of the technology into business.
- A team with expertise and background in fintech, capital markets, corporate legaltech, ecommerce, travel and supply chain.

Our areas of expertise



Strategic Blockchain consultancy

We help organizations in the process of understanding and adapting the technology for their specific business and operational needs.

Digital assets

We design, develop and maintain Digital Assets solutions based on Blockchain/DLT for the financial and corporate sectors to generate new business models, reduce costs, improve operational efficiency, and increase transparency and security.

Deep tech & Innovation

We are experts in advanced technologies that require extensive research, innovation and development to bring them to market. Solutions that are characterized to a high degree of complexity and novelty.

Some of our business verticals

		Use case deepdive
Digital Securities **Digital Credit**	We have extensive experience in the **tokenization of financial instruments** for our clients, spanning **stocks, bonds, funds, syndicated loans, and other credit products** across diverse industries like finance, energy, or real estate amongst others. Our solutions facilitate **DvP & atomic payments** as they integrate with digital money platforms	BME, IDB, CRE, allfunds, CaixaBank, Santander, BBVA, citi, OpenBrick
Digital Cash	We have a deep expertise in **digital money projects** across different typologies: **tokenized e-money, commercial bank money, CBDCs and Stablecoins**	BME, BBVA
Deep Tech	We provide deeptech knowledge to **high-tech and innovative projects** (e.g. smart contracts standards, network deployment, asset bridging,or interoperability)	DTCC, LACCHAIN
Legal Tech	We are developing **digital & blockchain-based legal solutions** that bring greater security, transparency and efficiency to the business and its users	GARRIGUES

02

Our use cases

Our Use Cases

1. Investment Funds

Tokenization of fund shares, market transfer orders, settlement and integration with T1 players.

2. Digital Bonds

A pioneering digital bond platform built for a large regulated CSD, using blockchain, and enabling DvP.

3. MTF for Alternative Markets

One of the first EU-based MTFs under the DLT Pilot Regime focused on bringing liquidity to alternative markets.

4. Private Equity

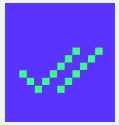
A new digital marketplace to issue, manage and trade Private Equity fund shares under a regulated framework (WIP).

5. Syndicated Loans

Full end-to-end platform / middleware to manage the entire lifecycle of syndicated loans using DLT. Built to boost *'originate to distribute'* CIB models.

Use Case 1: Investment Funds

Overview: Working since 2020 for the largest funds distribution entity in Europe in the development of their blockchain-based products, including investment funds tokenization, market order/transfer management, settlement and smart contract dev.



Problems to be Solved

- **Process Efficiency:** Funds distribution platforms need to reduce issuance, transfer orders & fund servicing processes and the manuality implied + reduce their op. risk.
- **Increased Margin**: Financial distributors needed to increase their operating margin by reducing their back-office costs.

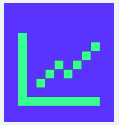
Our Role and Solution

Technology Partner providing support in a diverse range of initiatives: tokenization engine, client integrations, sandbox support, and market order transfers automation including subscriptions, redemptions and switches.

Detail of the solutions provided in the next slide

Regulatory Context

- Regulatory Context: current securities regulatory framework and Spanish Sandbox.
- As a funds platform operator with financial licence, we did not use a CSD or CCP.

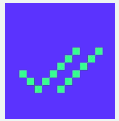


Impact & Value Provided

- **Improved efficiency and transparency:** The new platform provides a more streamlined & secure process for managing transfer funds and reduce manual reconciliations.
- **Attracting large financial players in the EU and US**: T1 FIs and AMs integrating their operations in production environments.

Use Case: BME Digital Bond Platform

Overview: Implementation of a native tokenized bond, denominated and settled on tokenized cash (full lifecycle on blockchain, including issuance, coupons, principal repayments, and DVP settlement). First digital bond registered under a regulated CSD, supervised by the Spanish market supervisor (CNMV).



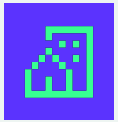
Problems to be Solved

- **Process Efficiency:** Bond issuance processes are lengthy, with T+2 settlement times and imply a high degree of manuality during the maintenance of the registry.
- **Real Delivery vs Payment**.
- **Real end-to-end digitalisation:** streamlining bond listing, issuance and distribution.

Our Role and Solution

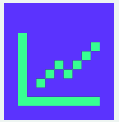
ioBuilders developed the full end-to-end platform / technology stack covering the full life cycle of the bond from issuance to management and trading. We used iob tokenization solutions to develop these capabilities enabling the DvP between the tokenized security and the tokenized cash.

Detail of the solution provided in the next slide.



Regulatory Context

- Regulatory Context: the digital bond platform was delivered using the existing regulatory framework as it did not apply any new exception and follow existing end-to-end processes.
- The project was built for the Spanish CSD.

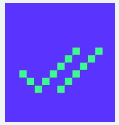


Impact & Value Provided

- **Pioneering** the issuance of a listed digital bond, denominated in digital money, using a DLT.
- **Implementing a real bond issuance within existing regulatory frameworks**.
- **Increased efficiency and automation**.
- **Attracting institutional investors** to trade using this technology.

Use Case 3: MTF for Alternative Markets

Overview: Creation of a Multilateral Trading Facility System for Alternative Markets, supervised by the european securities regulation authorities (CNMV and ESMA). The market allows the issuance, management and trading of securities in primary and secondary markets.



Problems to be Solved

- **Limited access** to alternative markets from issuers and investors and high-costs of entry.
- **Iliquidity** of alternative assets such as real estate, infra or renewable energies.

Our Role and Solution

Technology Partner and Co-founder of the regulated MTF in a JV with an EU-based T2 FI.

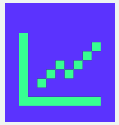
Developed a full technology stack leveraging our digital assets solutions Asseto for tokenized cash and securities and enable DvP.

Detail of the solution provided in the next slide

Regulatory Context

Part of the EU DLT Pilot Regime and applying to several exemptions including transparency, transfer orders, recording of securities in book-entry form and securities accounts, segregation of assets or CSD responsibilities.

Supervised by CNMV and ESMA.

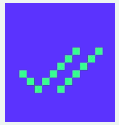


Impact & Value Provided

- **First DLT-based market infrastructure in Spain** (and one the first in the EU).
- **Providing liquidity** to traditional illiquid assets such as real estate vehicles.
- **Lower access cost** for issuers and investors.
- **Attracting all kind of investors** to access new alternative products.

Use Case 4: Private Equity

Overview: Creation of a full end-to-end solution to digitalise the entire lifecycle events of PE funds: allocation, commitments, capital calls, distribution of returns and secondary market. The model is under design and development with EU-based Tier 1 institutions.



Problems to be Solved

- **Limited access** to private equity investments due to high-costs of entry, large holding periods.
- **Iliquidity** due to the lack of secondary markets.
- **Considerable manpower** to manage the operations.

Our Role and Solution

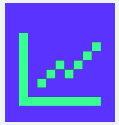
Combining our experience in digital funds, our experience in PE origination and our legal/regulatory mindset made us to design a new advanced model to digitalise the entire lifecycle of PE funds leveraging Asseto.

Detail of the solution provided in the next slide

Regulatory Context

The recent developments in the EU securities regulations with regards to the reduction of the entry thresholds to PE investments made it ideal for tokenization.

We are partnering with the largest law firm to fully align all the regulatory requirements.



Impact & Value Provided

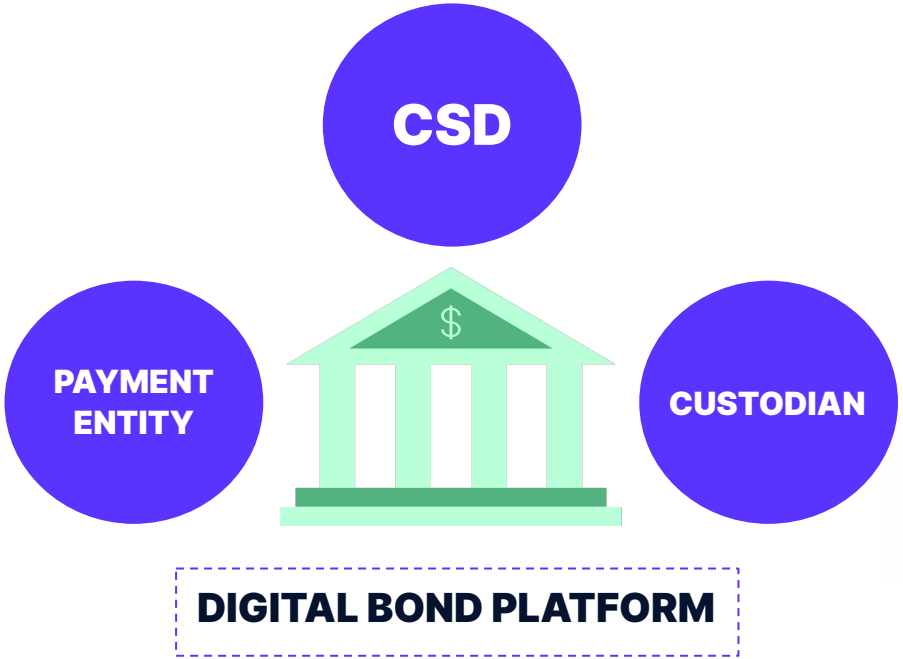
- **First market infrastructure in Spain** (and one the first in the EU) under regulatory scrutiny.
- **Providing liquidity** to private equity funds.
- **Lower access cost** for issuers and investors.
- **Attracting all kind of investors**.

03

BME Digital Bond

DIGITAL BOND PLATFORM

The Digital Bond Platform is a DLT platform designed to cover the the creation and post-issuance lifecycle of a bond in the Second-Tier register, complying with current regulations and market structure.



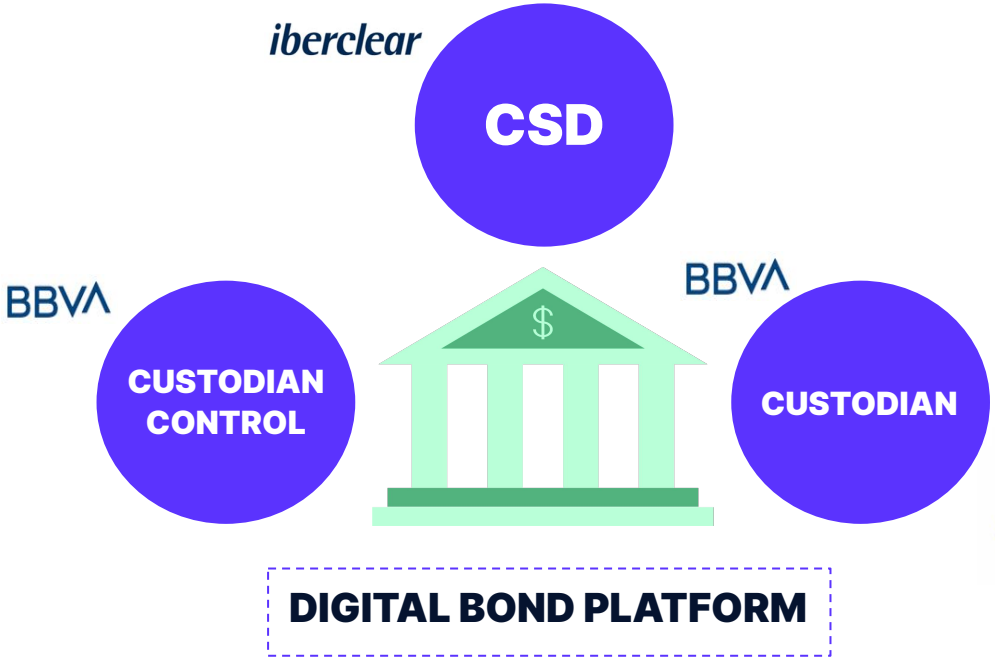
Actors characteristics

Account sign-up & login
Own business perimeter
DLT address

ACTORS

The CSD, the Custodian and the Payment Entity participate in the Digital Bond Platform accross the bond lifecycle.

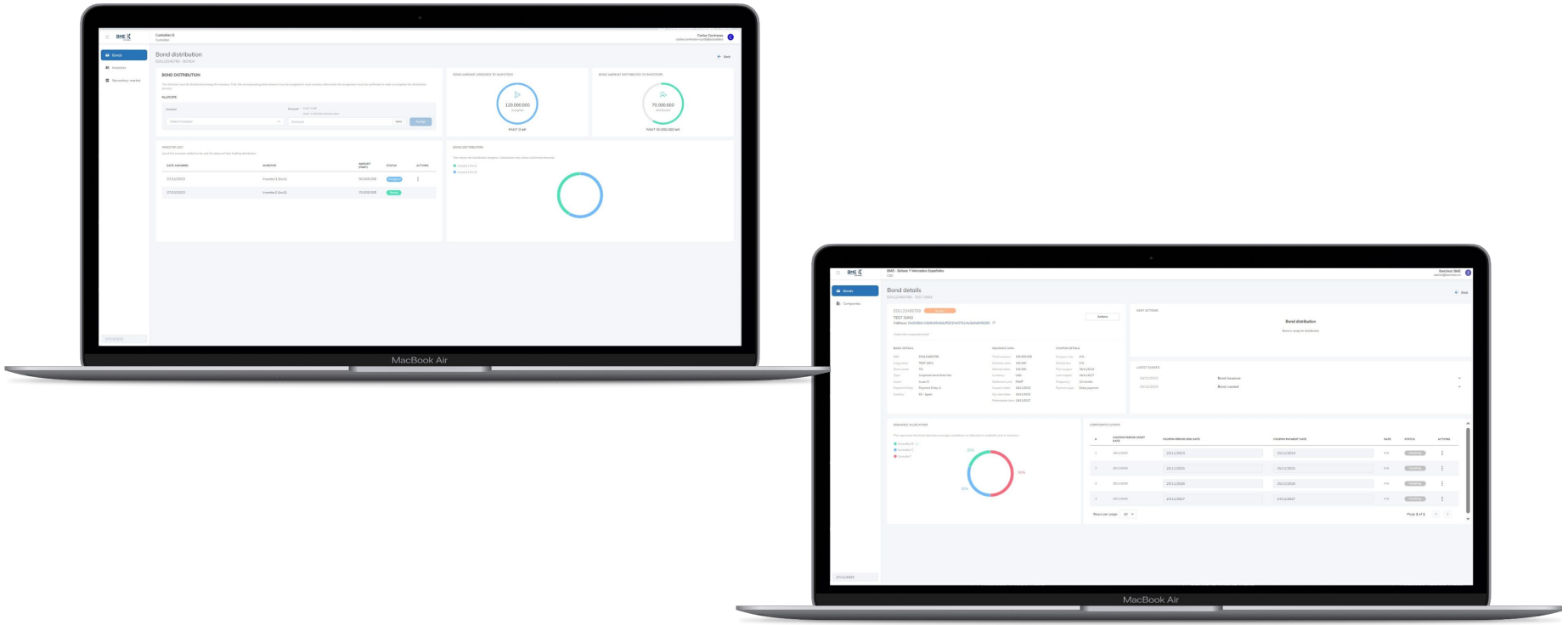
In the particular case of the MVP, with only one custodian, the latter could directly manage the entry of cash; however, in order to maintain the scalability of the model, the Payment Entity role has been kept through the Custodian Control figure.



Actors characteristics

Account sign-up & login
Own business perimeter
DLT address

DIGITAL BOND PLATFORM



Asseto Digital Money

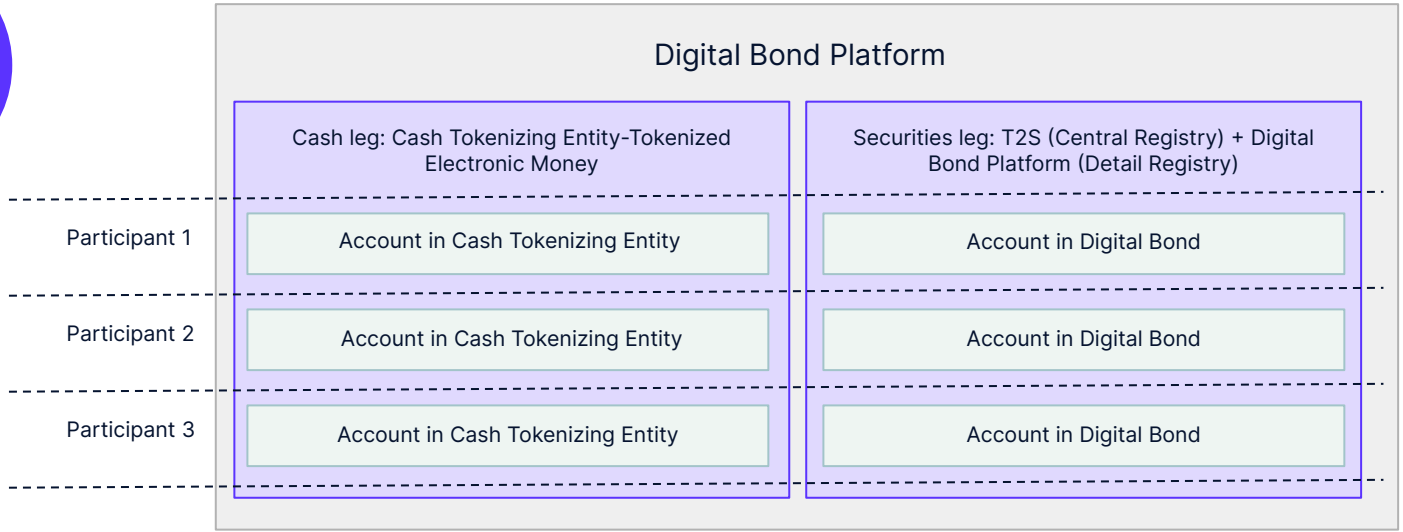
Asseto Digital Money is a technology suite for the issuance and management of regulated digital currencies provided by BBVA & ioBuilders, capable to issue tokenized money, perform blockchain-based payments and manage accounts and movements.

Its main objective is to allow DvP (Delivery Versus Payment) settlement operations in digital asset markets

BBVA

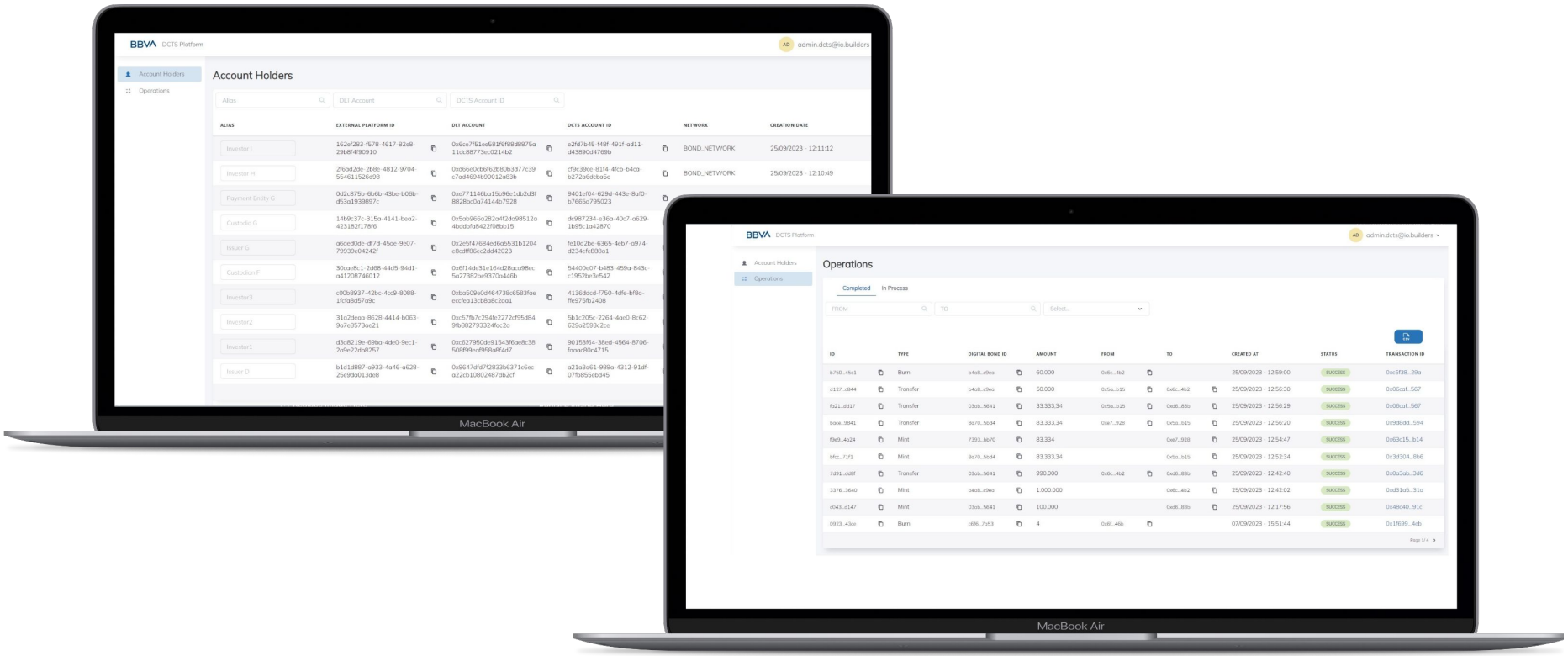
CASH TOKENIZER

POC model



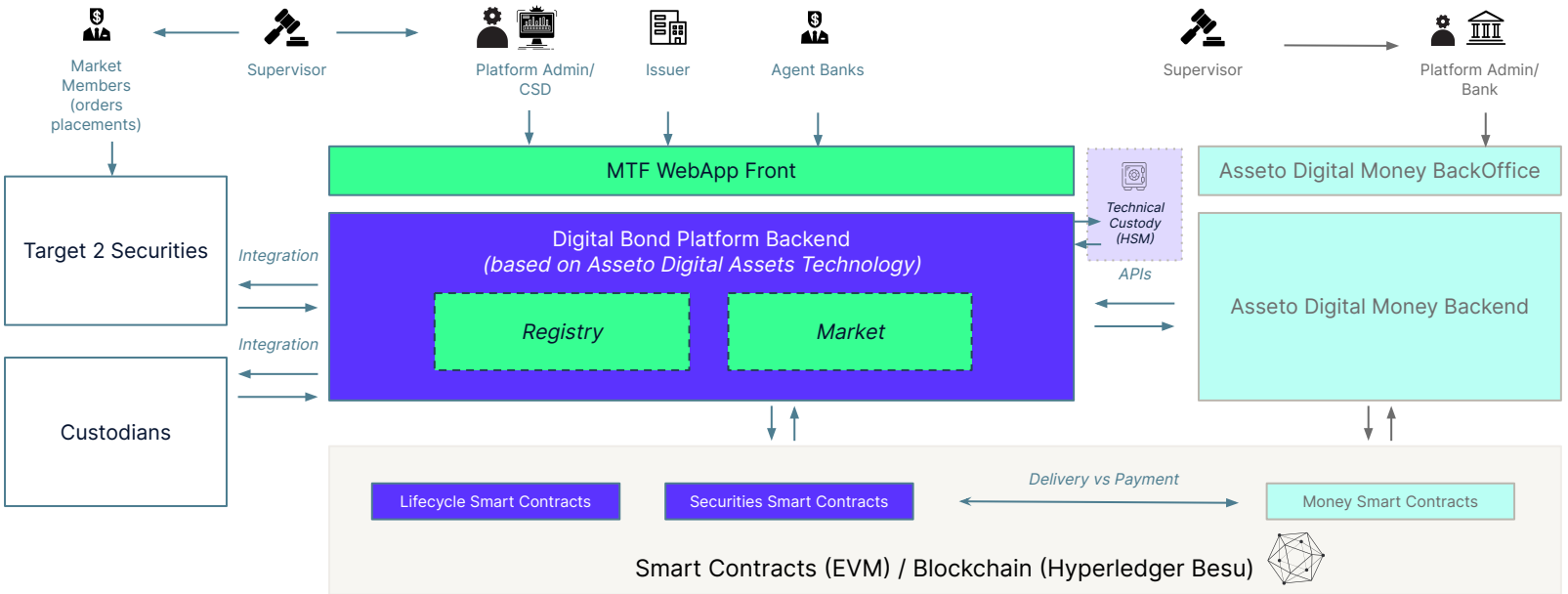
ioB

Asseto Digital Money



Use Case: BME Digital Bond Platform

The digital bond platform enables the issuance, management and trading of digital bonds using the same secure and regulated processes and channels as they are today, but boosting efficiency in the distribution of the bond among the investors and the asset lifecycle management thanks to smart contracts.



Blockchain Network

Ethereum technology was chosen due to the many different tools and software developed by the blockchain community to support tokenization. The network is implemented using Hyperledger Besu.

MAIN CHARACTERISTICS

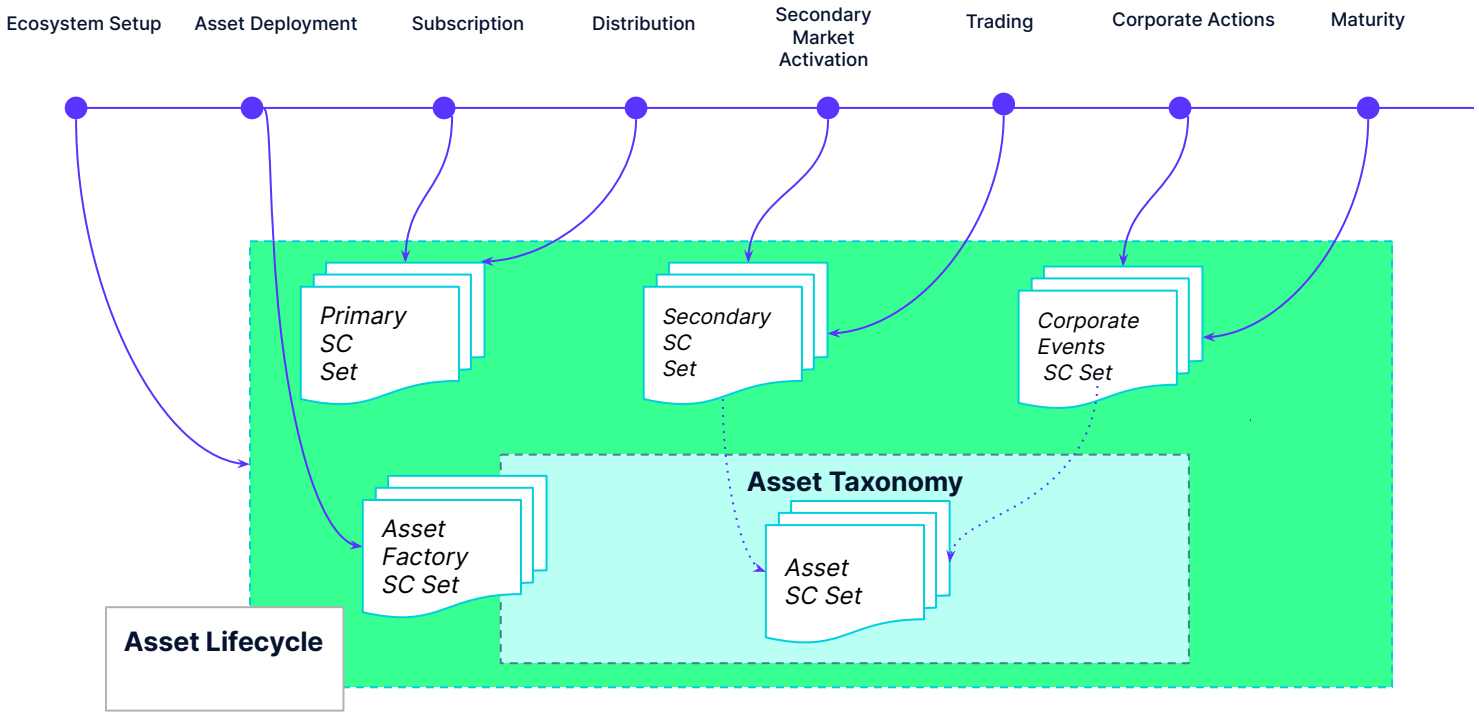
- Private permissioned network
- Reduced processing time per transaction
- Free gas network
- QBFT Consensus algorithm (PoA)

HYPERLEDGER BESU

- Open source
- Public & Private
- Variety of consensus algorithms
- Privacy and permissioning mechanisms
- Broad community support

HYPERLEDGER BESU

Full native tokenization approach



***SC**: Smart contract*

Asset Class Lifecycle (Per Asset Class)

Primary Market

- Issuance. Security deployment, configuration and activation.
- Subscription. Initial shares allocation.
- Distribution. Once subscription period finalized, issue and assign shares

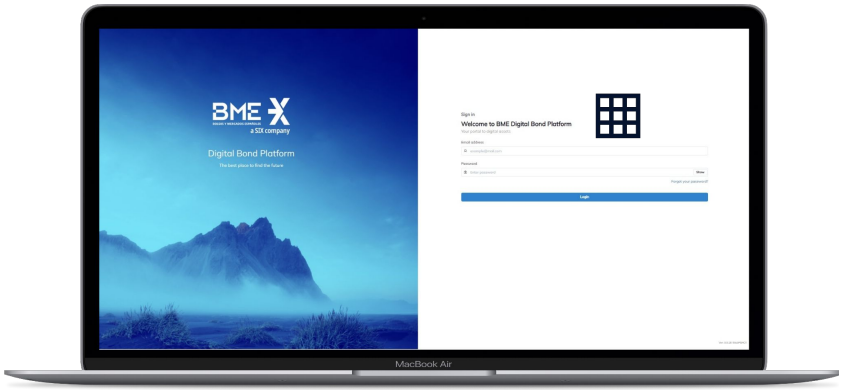
Secondary Market

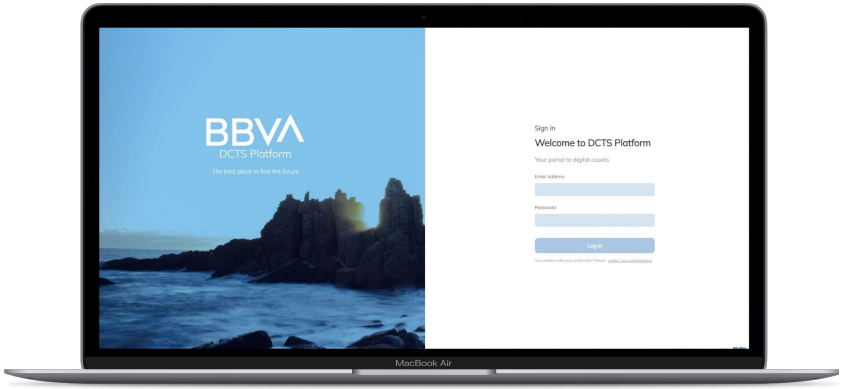
- Market mechanics
- Secondary trading
- OTC trading
- DVP scenarios

Corporate Events

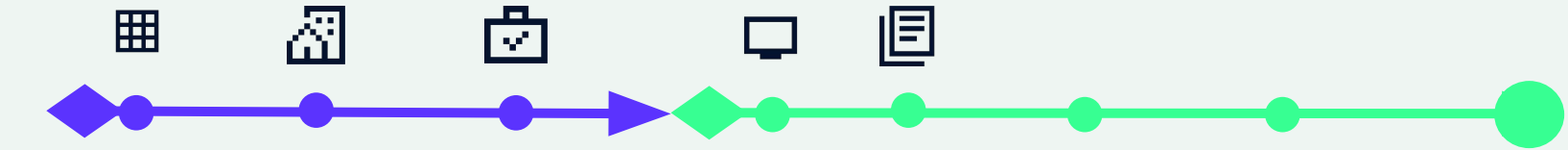
- Cash payments. Coupons, dividends or any kind of upside
- Asset class maturity
- Asset class specifics: capital calls, waiver, covenants voting, etc
- Special case like bankruptcy or other scenarios

Bond Lifecycle



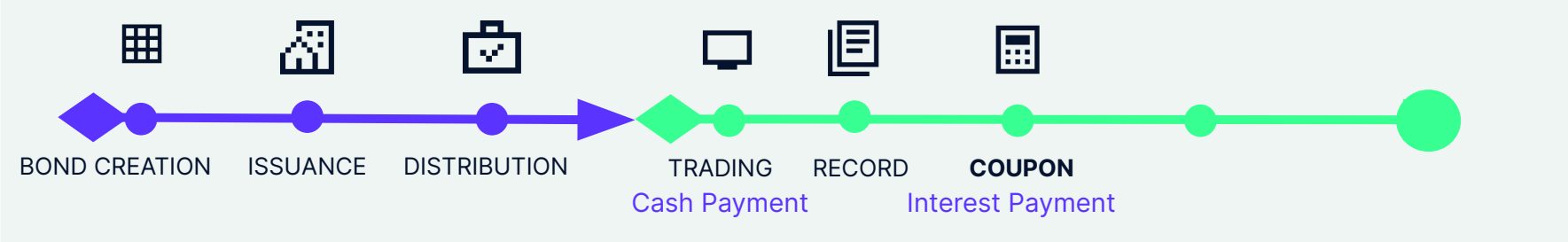


Lifecycle - Record Date



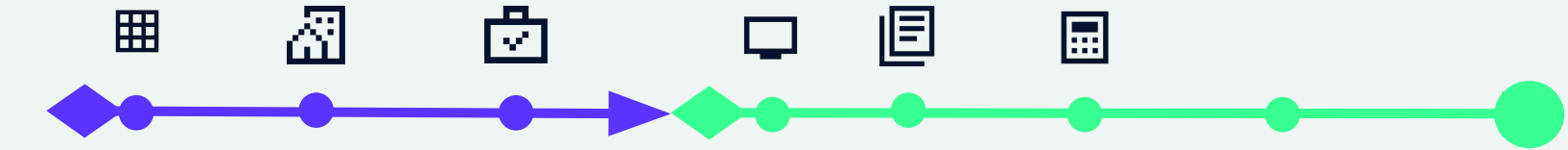
Actor	Digital Bond Platform	Smart contracts
PAYMENT ENTITY The Payment Entity requests a snapshot of the bond tokens	Tx Signed	Iterate through all custodians, and through all investors within each custodian, and create a copy of their Bond token balance
	Event received	Emit an event representing the snapshot has been completed

Lifecycle - Coupon (1)



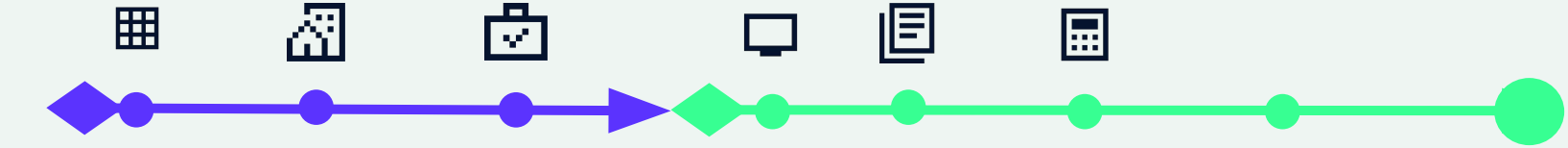
Actor	Digital Bond Platform	Smart contracts
PAYMENT ENTITY The Payment Entity requests to pay the coupon to the custodians	Tx Signed	Calculate the percentage of the coupon to pay to each custodian Transfer cash tokens from the payment entity to each custodian
	Event received	Emit an event representing the coupon has been paid to each custodian Emit an event representing the coupon has been paid to all custodians

Lifecycle - Coupon (2)



Actor	Digital Bond Platform	Smart contracts
CUSTODIAN 1		
The custodian requests to pay the coupon to the investors	Tx Signed	Calculate the percentage of the coupon to pay to each investor Transfer cash tokens from the custodian to each investor
	Event received	Emit an event representing the coupon has been paid to each investor Emit an event representing the coupon has been paid to all investors

Lifecycle - Coupon (3)

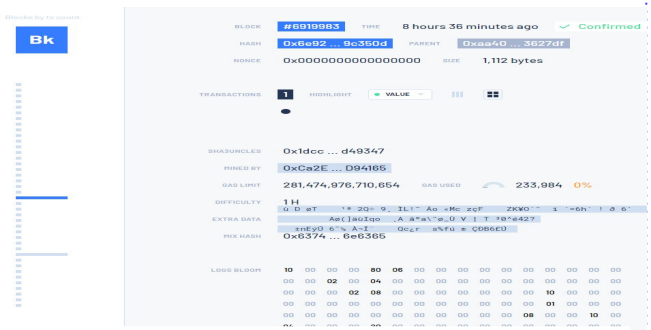


Actor	Digital Bond Platform	Smart contracts
CUSTODIAN N		
The last custodian requests to pay the coupon to the investors	Tx Signed	Calculate the percentage of the coupon to pay to each investor
		Transfer cash tokens from the custodian to each investor
	Event received	Emit an event representing the coupon has been paid to each investor
		Emit an event representing the coupon has been paid to all investors
		Emit an event representing the coupon has been paid to all investors of all custodians

Blockchain Monitoring

Two different tools are used to monitor and review the state and the content of the blockchain

Blockexplorer



Blockexplorer is a basic information viewer of blocks and transactions in the blockchain. Mainly but not only: the block hash, the validator node, difficulty, the transaction hash, the nonce or gas-related metrics, such as the cost, limit, average gas consumption per transaction, etc.

Ethstats

Ethstats displays real time and historical statistics about the network and nodes. These statistics include information related to each specific node in the network, the average validating time, validating difficulty or the block propagation time, which represents the time needed to let the rest of nodes know the last validated block.

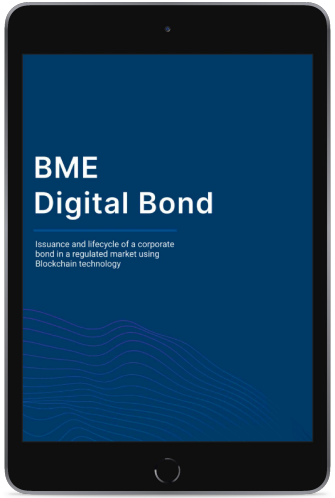
These tools allow us to have a glance at what is happening in the DLT

04

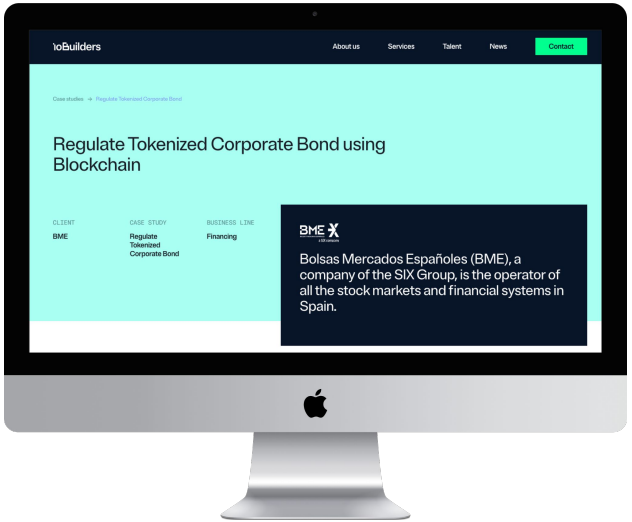
Q&A

Further reading and resources

BME Digital Bond Paper



ioB's Web Case Study



io.builders

Thank you!

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Web io.builders