Agenda item 1: General business cases for DLT

Background: members of the NTW-CG were invited to report on business cases in the payments, securities, and collateral management domains where DLT could make a difference compared to non-DLT settlement systems. In line with the purpose of the Eurosystem exploratory work, members were asked to preferably report on business cases relevant for wholesale payments and financial market transactions that are related to central bank money settlement.

With the NTW-CG's purpose of acting as a sounding board, such information sharing helps giving a better understanding of cases in which (only) DLT makes a difference in general, what the merits of DLT are and illustrating business cases that could be relevant for trials/experiments. Additionally, this could create inspiration to other market participants to further build on these examples.
The frequency and duration of this regular agenda item at the various meetings depends on proposals made by members and the length needed for other discussion points.

6th NTW-Contact
Group meeting
25/01/2024

Spunta Banca DLT - Italian banks experience

25 January 2024

Agenda

1	Spunta Banca DLT and the ABILabChain
2	Leonidas Project

Innovating the Italian banking sector with DLT

ABI Lab's Spunta Banca DLT initiative is **unique** in the world and provides the **entire Italian banking sector with a DLT platform**.
The current challenge is to enable the **coexistence of multiple use cases** on the same infrastructure.

Spunta Banca DLT is a **private permissioned distributed ledger** technology-based project for interbank reconciliation promoted by the Italian Banking Association (ABI) and managed and implemented by ABI Lab, the Italian Research and Innovation Centre for the Banks.

The project began in December 2017, when ABI Lab and NTT Data Italia started working on a blockchain proof-of-concept for straight-through processing of interbank reconciliations using R3's Corda platform. In addition to NTT Data and R3, Nexi is also a technical partner of the project.

From March 2020 the DLT-based system **is operational** across the Italian banking sector.

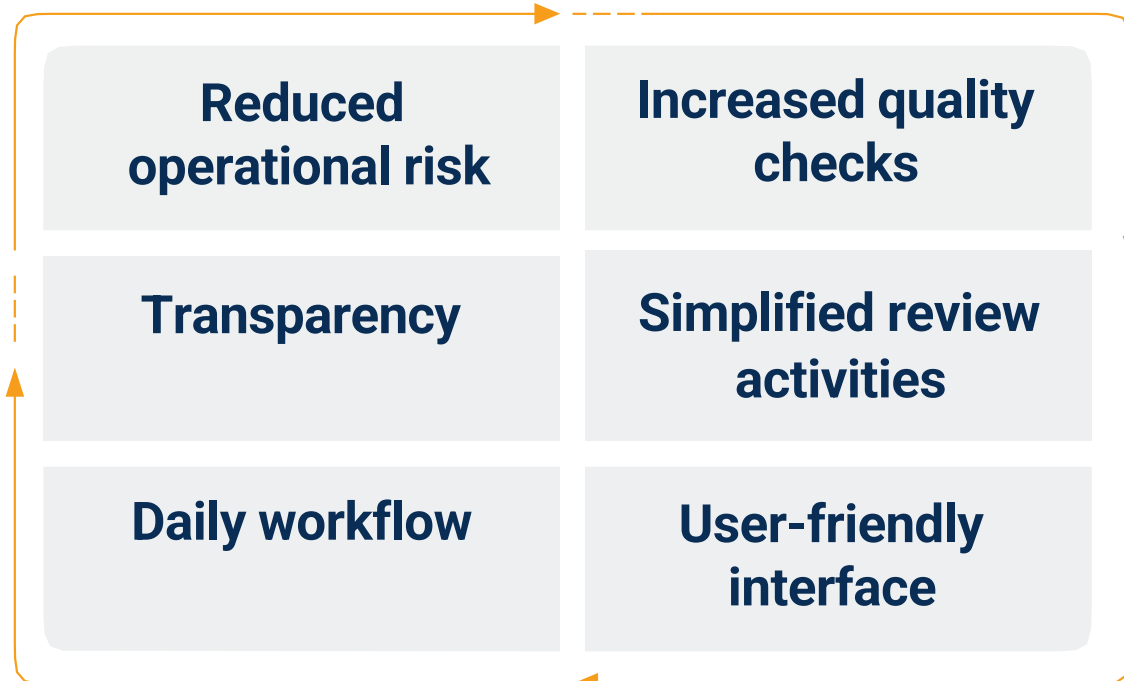# Interbank reconciliation: reasons why

Spunta project is about the matching of correspondent (or bilateral) accounts that involve two different banks. The interbank reconciliation procedure in Italy is linked to processes traditionally carried out by back offices and are aimed at reconciling the transaction flows that generate accounting entries in the bilateral accounts and at managing pending transactions.
After the automatic matching, the operators deal with the suspended movements.

Key drivers

- **Small and niche process**: the Spunta process is small, even in terms of business, with small benefits and is an internal process, it doesn't involve final customers

- The Italian Banking Association issued the **self-regulatory agreement** that rules the Spunta process (independency)

- **"Natural" ecosystem:** all Italian banks already have a reconciliation process; we did not have to "create" the ecosystem from scratch

Spunta Banca DLT Advantages & Benefits

DLT's key features , immutability, security and transparency, offer the opportunity to simplify processes and to increase the dialogue and the interconnection within the ecosystem, bringing significant value to every participant. This new application substitutes pre-existing systems, which have been switched off.

Reduced operational risk	**Increased quality checks**
Transparency	**Simplified review activities**
Daily workflow	**User-friendly interface**

Data loading

Investigations

Matching

ABILabChain – The infrastracture of the banks for the banks

- A **shared network** to support different use cases

- Numerous advantages for banks to position Italian banks as **pioneers**

- ABILabChain **enables** the Italian banking sector to **carry out new trials and use cases** effectively sharing components of the infrastructure. In particular, synergies are obtained on:

  - **Central Services** of DLT

  - **Licensing costs**

  - **Infrastructure** and **connectivity** management

  - Management of **testing** and release **activities**

  - **Node management** (authentication mode, file transfer, etc.)
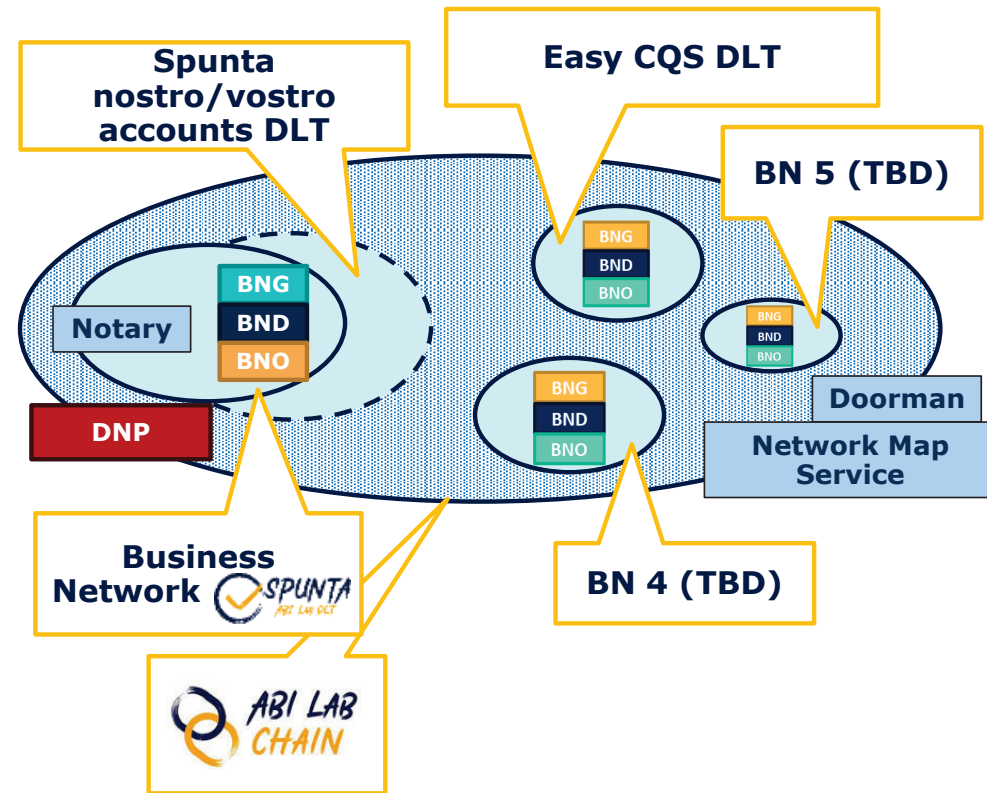
The Governance Model

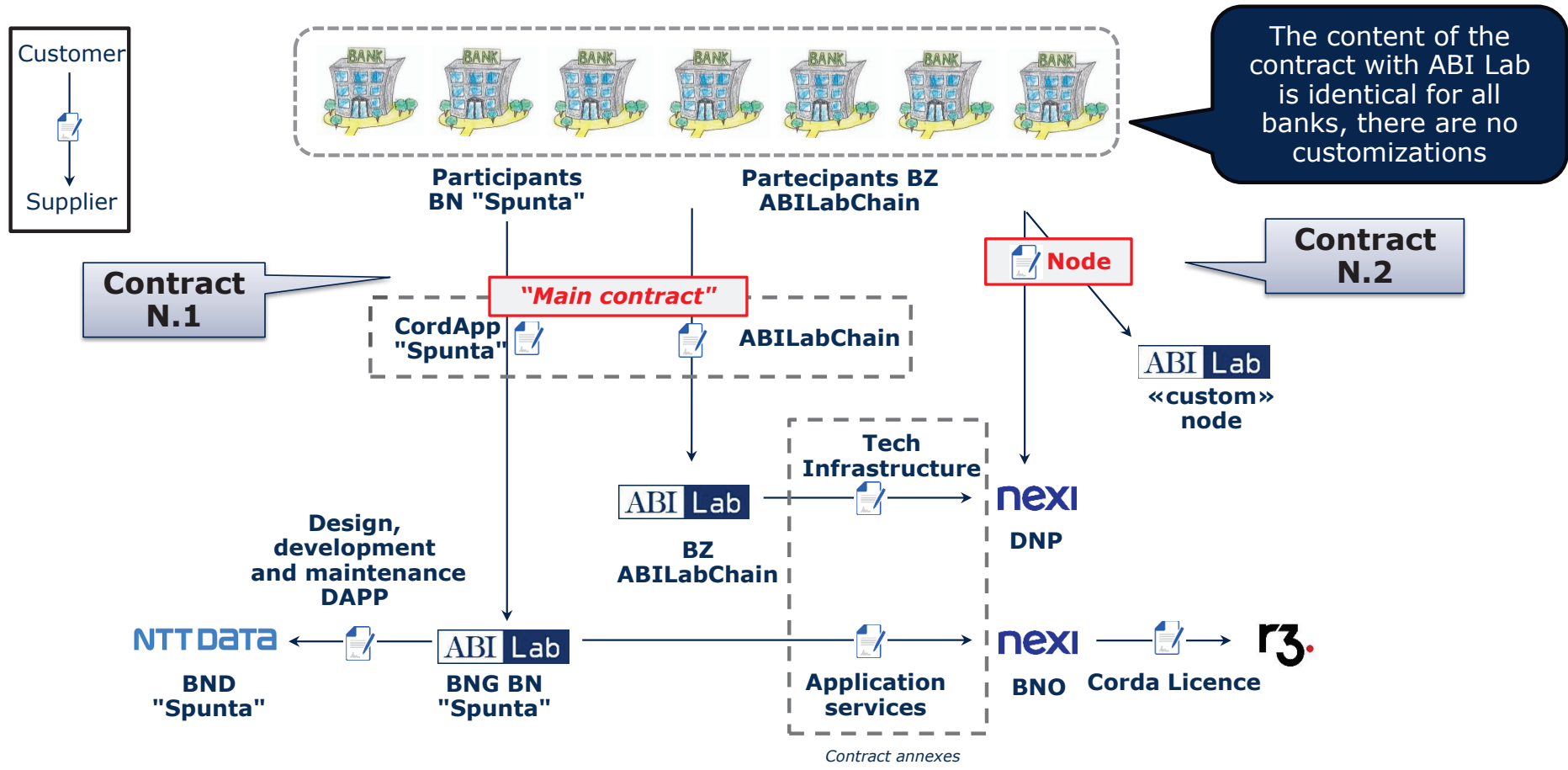|		
6 Levels of Governance	**Business Network (BN)**	Group of participants of a Business Network Zone (the area of cooperation and coopetition). Banks, insurances and other groups of large organisations. (Spunta is a Business Network that involves the whole financial sector.)
	Business Network Governor (BNG)	The entity in charge of creating, coordinating e managing a BN. Responsible for reaching consensus between BN participants. **BNG** identifies and selects **BNO** and **BND.**
	Business Network Designer (BND)	The company identified by **BNG** in charge of designing and developing one or more applications based on PP-DLT shared between BN participants. **BND** collaborates with **BNO** managing the availability of these multiple applications scenario within **BN** participants.
	Business Network Operator (BNO)	The company identified by **BNG** in charge of one or more application services. **BNO**, interacting and/or supported by **DNP** and **BND**, is responsible for event management, incident management, request fulfilment, problem management and service desk.
	DLT Network Provider (DNP)	The company identified by **BNO** whose DLT infrastructure is shared between BN participants. It basically guarantees all the needed operations support, customer assistance, SLA monitoring, etc. Specifically for **ABILabChain**, the **DNP** is also in charge of full identification of each node (it's a private permissioned DLT) the Cordapp node's deployment and helps propagating ABI rules and procedures.
	Platform	The real "operating system" enabling the use case, typically a **PP-DLT**.

Contracts and relationships

The content of the contract with ABI Lab is identical for all banks, there are no customizations

Customer → Supplier

Participants BN "Spunta"

Partecipants BZ ABILabChain

Contract N.1

Contract N.2

Node

"Main contract"

CordApp "Spunta"

ABILabChain

«custom» node

Tech Infrastructure

DNP

Design, development and maintenance DAPP

BZ ABILabChain

NTT DaTa

BND "Spunta"

BNG BN "Spunta"

Application services

BNO

Corda Licence

Contract annexes

FROM EXPERIMENTATION TO THE MATURE AND RELIABLE ABILabChain INFRASTRUCTURE: OPERATIONAL SINCE MARCH 2020

ABILabChain in figures

BREADTH AND PERVASIVENESS OF THE INFRASTRUCTURE
91 existing nodes

SPEED AND VOLUME MANAGEMENT
750+ million transactions
6+ Terabyte data on the ledger
380+ million movements between banks

NUMBER OF USERS
600+ users daily involved on the DLT platform

NUMBER OF INTERRELATIONS
540 Peer to Peer relationships

SCALE OF THE DLT ECOSYSTEM
1500+ people involved

DISTRIBUTED NETWORK OF NODES
9 different points of access in Italy

Key Success Factors & Attention points addressed

Success factors

Capability to define (and gain acceptance of) a rule-book

Technical team with proven competence

Long term strategy and commitment

Legal and contractual model

Direct interaction with development team of the platform

Full trust of the Business Network

Work on the infrastructure

SPUNTA ABI LAB DLT

Attention points addressed

Governance definition

Integration with internal systems of each bank

Migration plan

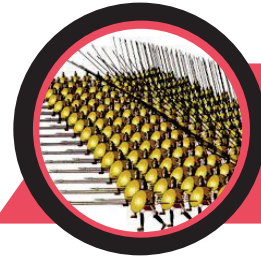Avoid any lock-in

Use case costs: Running + Infrastructure

Lessons learned

DISTRIBUTED TECHNOLOGY CALLS FOR DISTRIBUTED GOVERNANCE

The involvement of the stakeholders in the decision making (both strategical and operational) is crucial with a distributed technology.

WORK IN SYNC

Working as an ecosystem requires several entities to work at the same time on a single project with the same goal.

TECHNICAL AND PROCESS ASPECTS ALWAYS ALIGNED

Innovation works hand in hand with operations, to really transform a process. For this reason, business experts must be enabled to understand the basics of technology and to drive the change.

IT'S NOT ALL ABOUT EFFICIENCY

Transparency, ensure that "what you see is what I see", operational risk reduction have been the key factors for banks to switch off pre-existing systems.
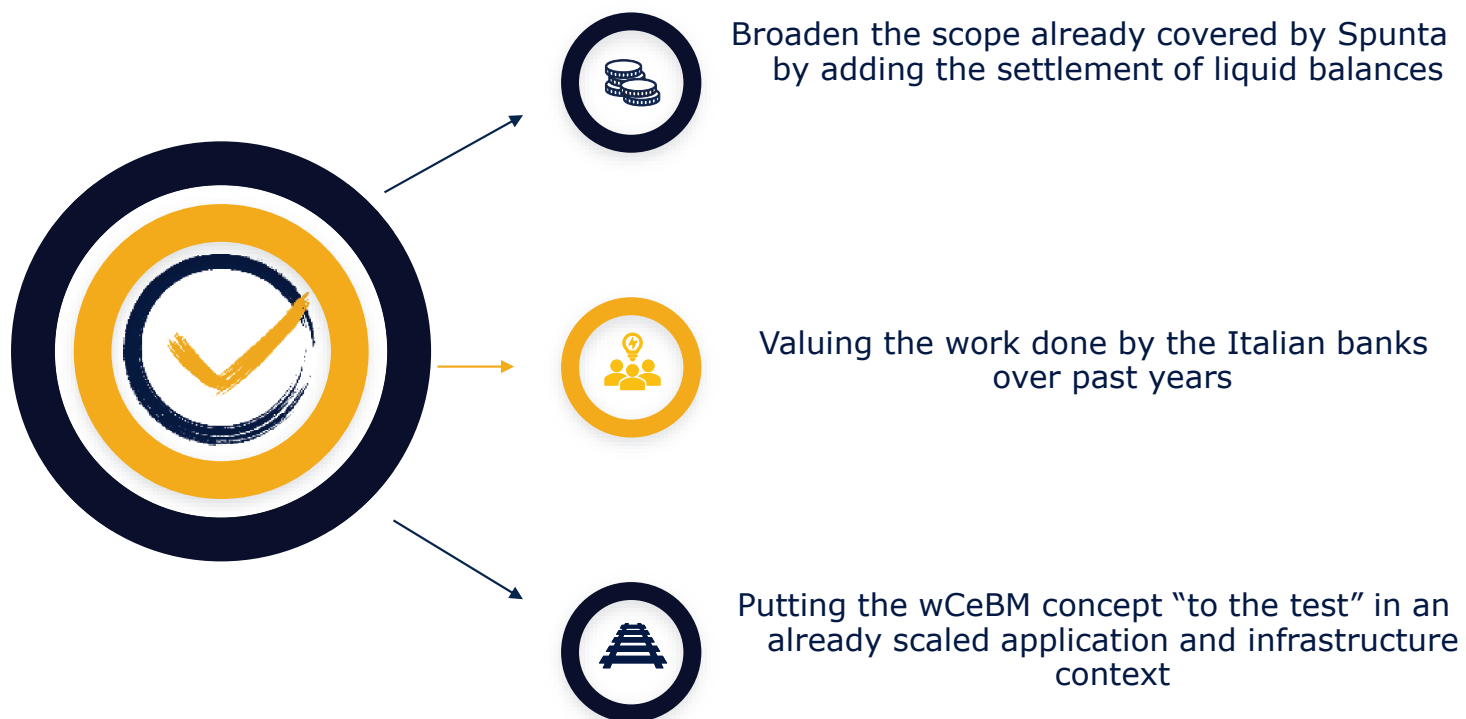
Agenda

1   Spunta Banca DLT and the ABILabChain

2   Leonidas Project

ABI Associazione Bancaria Italiana

LEONIDAS in a nutshell

Broaden the scope already covered by Spunta by adding the settlement of liquid balances

Valuing the work done by the Italian banks over past years

Putting the wCeBM concept "to the test" in an already scaled application and infrastructure context

LEONIDAS

Liquidation
Effective
ONcha**I**n
Dlt
Asset on
Spunta

Objectives of the experimentation

01 Test within a distributed infrastructure the settlement of liquid balances through the use of a simulated wCeBM implemented and issued on the ABILabChain using the Full-DLT model as interoperability solution.

02 Carry out a comparative analysis against the current settlement process.

03 Implement within the interbank Spunta process, programmability logic also at the interbank value transfer stage.

04 Develop further programmability logics, even outside the Spunta process, which envisage the exchange of value between banks.

ABI Associazione Bancaria Italiana

The task force

ABI: representatives of the Innovation Office and the Payment Systems Service Office, expert in the domain of DLT and crypto-activities, and settlement and payment schemes.

ABI Lab: Managers and representatives of the Blockchain & DLT Competence Center, and experts of the Spunta Banca DLT process will take part in the initiative.

NTT DATA Italia: CBDC streams and private/banking ecosystems Managers, with extensive experience in innovation and cutting-edge technologies.

R3 Limited: Technical Account Manager, Solution Architect, CBDC Business Lead.

Group of 17 pilot banks which, due to their pivotal role in the Spunta Banca DLT process, and the importance of distributing the infrastructure nodes, will allow a simulation as realistic as possible and an analysis on the impact on the banking operations.

Interbank working group

The initiative was selected as part of the second Call for Proposals - focused on the use of DLT for banking and financial services - of "Milano Hub", the innovation center created by the Bank of Italy to support the digital evolution of the financial market. In the context of the Call for Proposals, the project benefited from the dialogue with a multidisciplinary team from the Bank of Italy

Leonidas project – Use cases

Liquid Balance

Improving Spunta, adding the debt settlement of interbank balances through digital currency exchange on DLT.

The use case solves the "last-mile problem" by completing the end-to-end process up to the payment of debts between banks, providing a high level of automation, transparency and efficiency.

Cash in Transfer

Efficient cash supply and demand management between banks, building on what has already been achieved with an already existed initiative of a group of Italian banks.

This use case makes it possible to link atomically the transfer of physical cash with related settlement of deposits/ withdrawals, providing a single reliable record of the transaction and increasing confidence in the system.
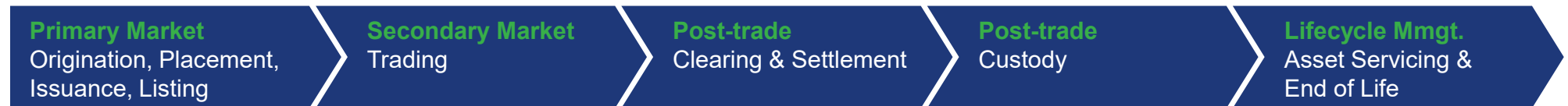
ABI Associazione Bancaria Italiana

What's in DLT and CBDC for the ecosystem?

Focus on lifecycle of a bond

Primary Market Origination, Placement, Issuance, Listing	Secondary Market Trading	Post-trade Clearing & Settlement	Post-trade Custody	Lifecycle Mmgt. Asset Servicing & End of Life

Pain Points — Traditional Financial System (TradFi)

• Manual, non-automized process (time) • Lack of standardization (data) • Bank syndicate as intermediary (costs)	• High transaction costs • Poor data quality • Fragmented liquidity	• Extended settlement time frame (costs & risks) • Siloed data structures • Long supply chain	• Siloed data structures • Multiple reconciliations • Heavy processes for maintenance/ safekeeping and reporting of ownership records	• Manual processes for booking coupons and payment at maturity • Complex processing of corporate actions

Optimisation with DLT — Assets on Chain: Automation, transparency and real-time data

• Registration of securities and funds directly by issuer	• Innovative blockchain-enabled trading platform • Automation of trade execution	• Instant matching and clearing, i. e. atomic settlement • Fewer and new intermediaries	• Single, immutable record of truth, therefore less manual reconciliations • Fewer and new intermediaries	• Smart contracts automating trigger of events

Positive Impact of wCeBM

Cash on Chain: Full potential of automated bond lifecycle & financial integrity, legal tender and economic certainty in capital markets on DLT

• On demand real-time issuance of securities	• Lower transactions costs • Reduced credit risk exposure	• Increase efficiency of settlement and clearing • Less manual reconciliation process (reduced risks, costs and settlement delays)		• Programmable money with accessibility via wallet • Real-time transfer of assets

Benefits of the New Ecosystem around Decentralized Finance (DeFi) with Assets and Cash on Chain

Innovation and competition leads to higher speed, lower cost, reduction of risk

Higher level of automation; Simplification of administrative processes

ESG and static data: High level of transparency through real-time golden sources

Settlement and Clearing: Atomic and instantanious, i. e. not t0, but s0 (same second); also fewer and new intermediaries
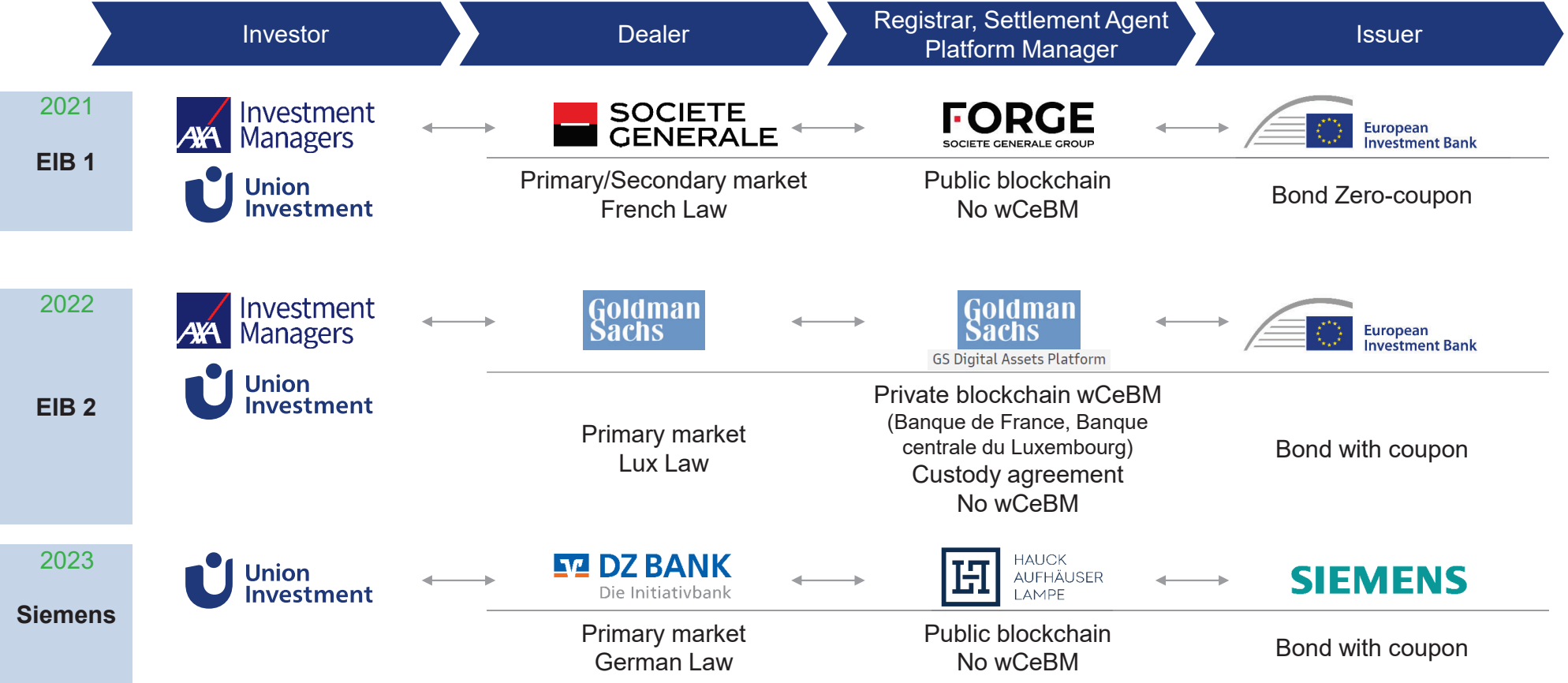
Smart Contracts as „brain" of DApps (Decentrailzed Applications) in the focus of the DeFi universe

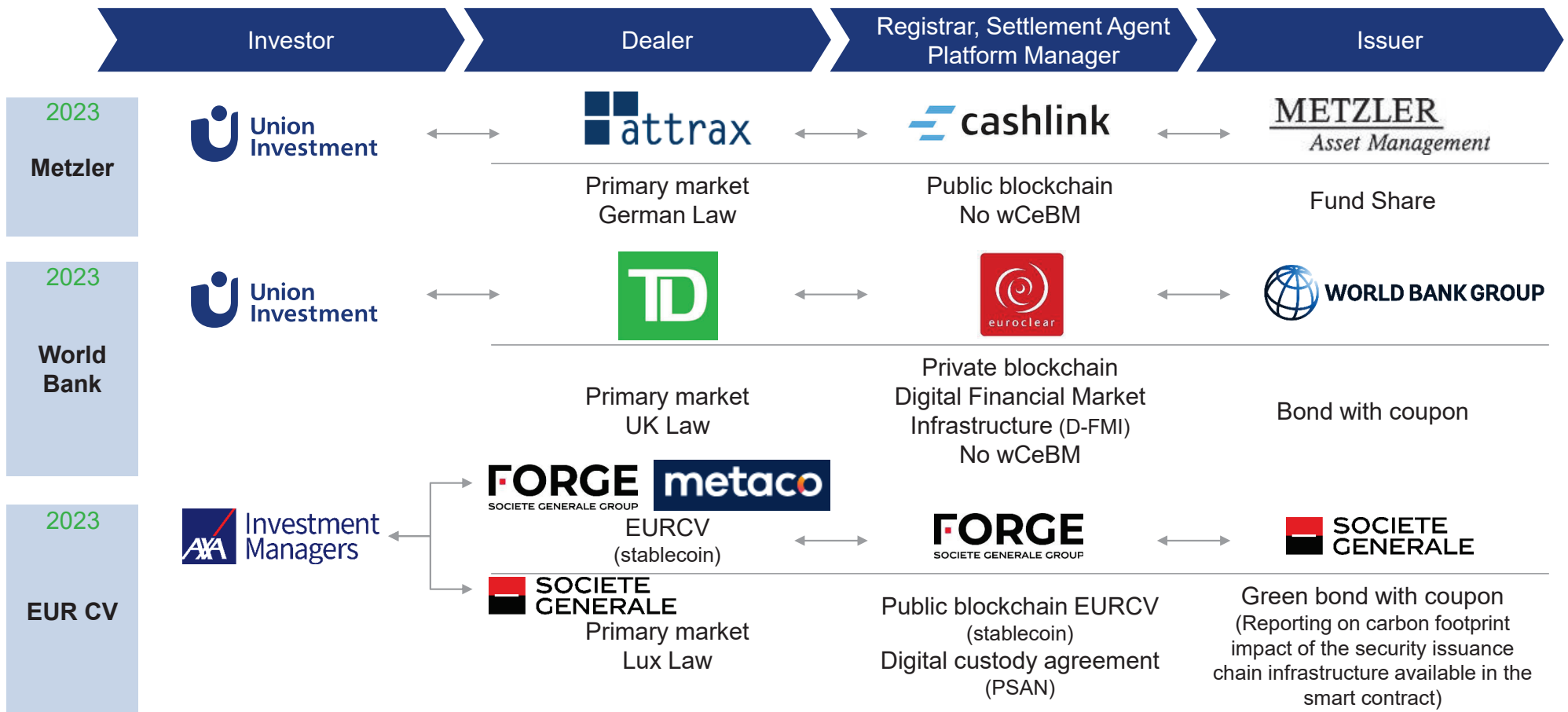Customer Accessibility: Combined wallet with immediate accessibility to assets and cash on chain

Use Cases in Cryptobonds and –Fund Shares (1)

AXA IM and Union Investment blockchain transactions

Investor	Dealer	Registrar, Settlement Agent Platform Manager	Issuer

2021 EIB 1

AXA Investment Managers / Union Investment ↔ SOCIETE GENERALE ↔ FORGE SOCIETE GENERALE GROUP ↔ European Investment Bank

- Primary/Secondary market French Law
- Public blockchain No wCeBM
- Bond Zero-coupon

2022 EIB 2

AXA Investment Managers / Union Investment ↔ Goldman Sachs ↔ Goldman Sachs (GS Digital Assets Platform) ↔ European Investment Bank

- Primary market Lux Law
- Private blockchain wCeBM (Banque de France, Banque centrale du Luxembourg) Custody agreement No wCeBM
- Bond with coupon

2023 Siemens

Union Investment ↔ DZ BANK Die Initiativbank ↔ HAUCK AUFHÄUSER LAMPE ↔ SIEMENS

- Primary market German Law
- Public blockchain No wCeBM
- Bond with coupon

Use Cases in Cryptobonds and –Fund Shares (2)

AXA IM and Union Investment blockchain transactions

Investor	Dealer	Registrar, Settlement Agent Platform Manager	Issuer

2023 Metzler

Union Investment ↔ attrax ↔ cashlink ↔ METZLER Asset Management

Primary market
German Law

Public blockchain
No wCeBM

Fund Share

2023 World Bank

Union Investment ↔ TD ↔ euroclear ↔ WORLD BANK GROUP

Primary market
UK Law

Private blockchain
Digital Financial Market
Infrastructure (D-FMI)
No wCeBM

Bond with coupon

2023 EUR CV

AXA Investment Managers → FORGE SOCIETE GENERALE GROUP metaco

EURCV
(stablecoin)

FORGE SOCIETE GENERALE GROUP ↔ SOCIETE GENERALE

→ SOCIETE GENERALE
Primary market
Lux Law

Public blockchain EURCV
(stablecoin)
Digital custody agreement
(PSAN)

Green bond with coupon
(Reporting on carbon footprint
impact of the security issuance
chain infrastructure available in the
smart contract)

Summary

1 **Blockchain** enables **token economy**; token economy as a **disruptive factor** makes existing processes more **efficient** in terms of speed, costs and risks and **enables new business models**

2 Combination of **assets on chain** and **cash on chain** is key for leveraging significant synergy potentials; this year in spotlight are first **DLT-trading platforms** (DLT Pilot Regime) and **e-Money** (Stablecoin under MiCA, Trials around wCeBM)

3 Tokenization of assets creates higher liquidity through **fungibility**, lowers entry hurdles for investors due to **fractionalization** and is a nucleus of a **new generation of financial assets**

4 Cash on Chain enables **atomic and instantaneous settlement and clearing processes**, offers more **transparency** and lowers **risks and costs**; makes **global payment processes** more efficient

5 **Tokenization** generates a significant amount of **data** that creates a competitive advantage also in **ESG topics** (like measurement of carbon footprint for financial ecosystem, trading activity and position keeping)

We are always available to answer your questions

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Union Investment

Laurence Arnold

AXA Investment Managers

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Contact: Union Investment Institutional GmbH, Weissfrauenstrasse 7, 60311 Frankfurt/Main, Germany, tel. +49 69 2567-7652
Unless otherwise stated, all information, descriptions and explanations are dated 31 January, 2024.

Disclaimer, AXA IM

Motivation: OTC Derivatives come with complex Processes and Frictions

Intention of "Classic" Derivatives

– Manage Market Risk (e. g. Interest Rate Swap)

Frictions and Processes

– OTC-Derivative is a Bilateral Contract ➔ Counterparty Credit Risk

– Mitigate Counterparty Risk via Break-Clauses and Collateral-Process

– No Payment-Netting ➔ Settlement Risk

– Different Valuation Models ➔ Collateral Consolidation / Dispute-Process

– Counterparty Risk of Collateral ➔ Over-Collateralize / Initial Margin

– Increased Capital Requirements (Basel II / III)

– Interest Rate Swap: Clearing Obligation ➔ CCP

– Liquidity Requirement by CCP ➔ Liquidity Risk

– CCP's complex Default Resolution Process with non-deterministic auction process

DZ BANK Gruppe

SDC designs a frictionless Post-Trade Process for an OTC Derivative as a Smart Contract

An SDC maps an
OTC Derivative in
a Smart Contract

Predefined product
elements ensure
algorithmic processing

Proof-Of-Concept:
Legally binding trades
have proven its usage *)

*) 2021: „German Financial Institutions successfully complete First Trade of OTC Interest Rate Derivatives Using Digital Smart Contract"
https://uk.practicallaw.thomsonreuters.com/w-031-7215?originationContext=document&transitionType=DocumentItem&contextData=(sc.Default)&firstPage=true
*) 2022: „New digital Standard: DZ BANK and Union Investment trade OTC Derivative as Smart Contract"
https://www.dzbank.com/content/dzbank/en/home/we-are-dz-bank/press/news_archive/2023/new-digital-standarddzbankandunioninvestmenttradeotcderivativeas.html

DZ BANK Gruppe

Design Elements of a SDC

Digital Trade Data
Format defines all trade and process terms, can be stored immutably on DLT

Valuation Model
is part of the legal contract and determines calculation of the settlement amount

Settled-2-Market
procedure is based on a prefunding mechanism and removes existing collateral processes

Prefunding
is required and gets verified at the beginning of each settlement cycle. This guarantees settlement

Termination Feature
is based on pre-agreed fees reduces uncertainties and shortens the close-out period

No Contract Risk ✓   **No Disputes** ✓   **No Collateral Process** ✓   **No Counterparty Risk** ✓   **No Close-Out Risk** ✓

DZ BANK Gruppe

SDC as Use Case for ECB Exploratory Phase 2024

– Smart Derivative Contract (SDC)

 – removes an intermediary when implemented on a DLT as a **Decentralized Application** (DApp)

 – settles in EUR: Requires a digital payment solution only, no separate "Asset Chain" is needed

 – unlocks its full potential with the availability of a digital currency

– Scope within ECB Exploratory Phase in 2024

 – **SDC-Trade as Trial:** Legally binding SDC-based OTC-Trade with other counterparty over a limited time period (e. g. 10 trading days), alternative „SDC-Experiment": Non-legally binding processing against test-environment

 – SDC-Settlement makes use of one of the provided CBDC solutions

 – E. g. open-source SDC-Code (ERC-6123) could be installed via an own node on Bundesbank Trigger Chain

DZ BANK Gruppe

Summary

– What is the problem the Business Case would address and what opportunity does it create?

   – SDC removes Counterparty Credit Risk and frictions in OTC-Derivatives post-trade processing

– How would DLT overcome/fix the identified challenge(s)?

   – Why would (only) DLT address the challenge(s)?

      – DLT would enable full Disintermediation and Digitalisation of Post-Trade Processing

   – Where would DLT bring improvements where current infrastructures are unable to?

      – Complete Determinism: No Contract Risk, no Dispute, no Settlement Risk, no Default Risk

   – How would you address the challenge(s) without DLT?

      – SDC is a technology agnostic. Without DLT a central operator would be required.

– What are the learnings you envisage to obtain? What is the experience you wish to gain?

   – Central Bank Digital Currency (CBDC) leverages full potential of SDC concept

DZ BANK Gruppe

Further Reading

Digital SDC-Process from Trade to Settlement

M - Margin-Buffer
P - Termination Fee

Check → Trade an SDC → Settlement (max M) → Check

ok

fail

Initial Funding of M + P

Open Margin Accounts with Pledge Agreement

Settlement from pledged amount (capped at M)

Trade Termination

Causing Party pays P
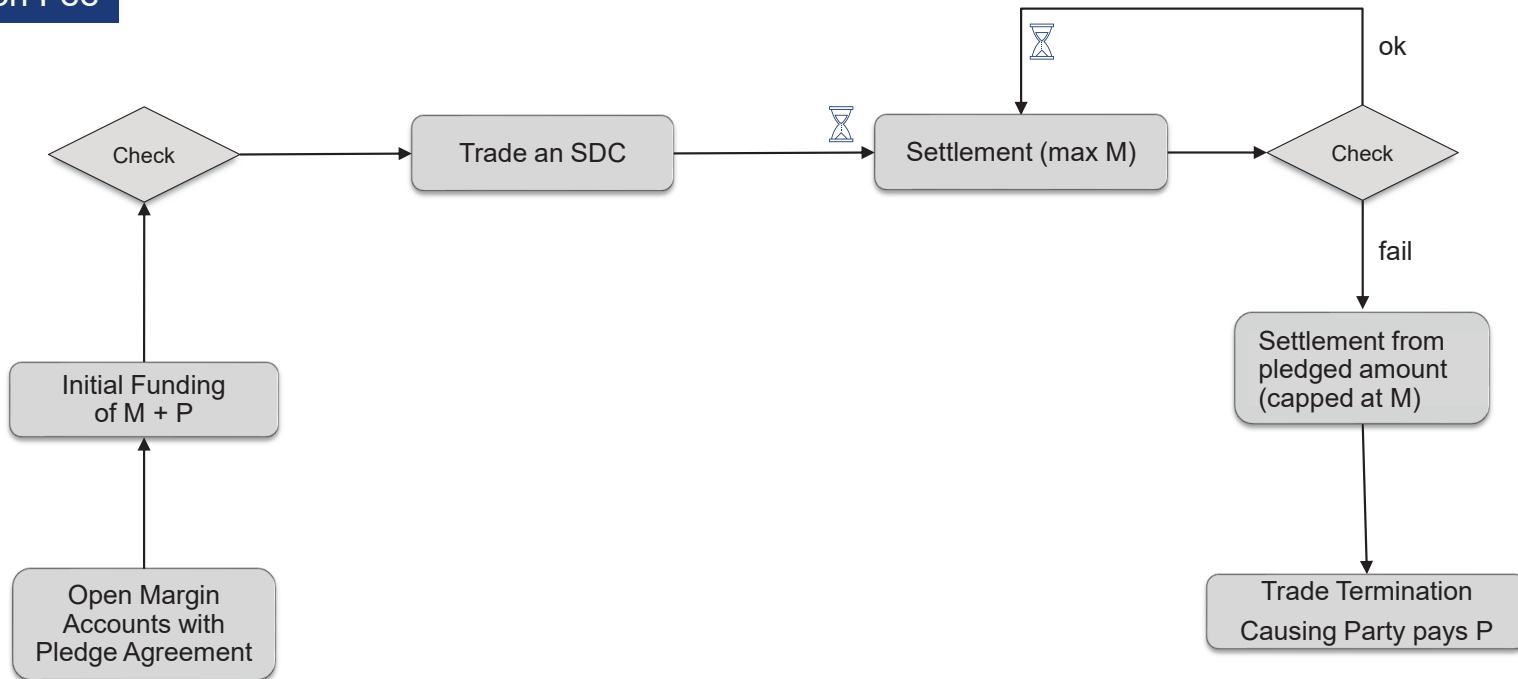
Digital Trade and Process Definitions – Towards Alignment with ISDA CDM

Product Data IRS (FPML)

```xml
<swap>
    <swapStream xmlns="">
        <payerPartyReference href="CP1"/>
        <receiverPartyReference href="CP2"/>
        <calculationPeriodDates id="floatingCalcPeriodDates">
            <effectiveDate>
                <unadjustedDate>2022-12-19</unadjustedDate>
                <dateAdjustments>
                    <businessDayConvention>MODFOLLOWING</businessDayConvention>
                </dateAdjustments>
            </effectiveDate>
            <terminationDate>
                <unadjustedDate>2032-12-19</unadjustedDate>
                <dateAdjustments>
                    <businessDayConvention>MODFOLLOWING</businessDayConvention>
                    <businessCenters id="primaryBusinessCenters">
                        <businessCenter>DEFR</businessCenter>
                    </businessCenters>
                </dateAdjustments>
            </terminationDate>
            <calculationPeriodDatesAdjustments>
                <businessDayConvention>MODFOLLOWING</businessDayConvention>
                <businessCentersReference href="primaryBusinessCenters"/>
            </calculationPeriodDatesAdjustments>
            <calculationPeriodFrequency>
                <periodMultiplier>6</periodMultiplier>
                <period>M</period>
                <rollConvention>EOM</rollConvention>
            </calculationPeriodFrequency>
        </calculationPeriodDates>
        <paymentDates>
            <calculationPeriodDatesReference href="floatingCalcPeriodDates"/>
            <paymentFrequency>
                <periodMultiplier>6</periodMultiplier>
                <period>M</period>
            </paymentFrequency>
```

SDC Contract Terms

```xml
<parties>
    <party>
        <name>Counterparty1</name>
        <id>CP1</id>
        <marginAccount>
            <type>constant</type>
            <value>20000.0</value>
        </marginAccount>
        <penaltyFee>
            <type>constant</type>
            <value>5000.0</value>
        </penaltyFee>
        <address>0xCE7E5Abf9A42730345716e16c145592e679!
    </party>
```

Software-Version – Valuation Model

```xml
<?xml version="1.0" encoding="UTF-8"?>
<smartderivativecontract>
    <valuation>
        <artefact>
            <groupId>net.finmath</groupId>
            <artifactId>finmath-smart-derivative-contract</artifactId>
            <version>0.1.8</version>
        </artefact>
    </valuation>
```

Market Data Symbols

```xml
<marketdata>
    <provider>refinitiv</provider>
    <marketdataitems>
        <item>
            <symbol>EUROSTR=</symbol>
            <curve>ESTR</curve>
            <type>Fixing</type>
            <tenor>1D</tenor>
        </item>
```

Settlement Parameter

```xml
<settlement>
    <settlementDateInitial>2022-12-19T12:00:00</settlementDateInitial>
    <settlementTime>
        <type>daily</type>
        <value>17:00</value>
    </settlementTime>
    <marketdata>
        <provider>refinitiv</provider>
```

DZ BANK Gruppe

Economic Benefits from a Trading Perspective

Product Features		Implications
The Trade parameters are digitized (fpml) and the valuation model is contractually defined	»	No contract risk, no dispute processes, **no intermediaries (→ Possible Cost Reduction)**
The SDC processes the settlement on a netted basis - "Settled-2-Market".	»	No separate collateral process
The SDC replicates the economics of a collateralized interest rate swap up to a maximum amount M	»	An SDC can be used to manage Market Risk in the same way as a classical Interest Rate Swap (IRS)
The maximum amount M corresponds to the amount of mutually pledged account balances	»	The counterparty default risk from the SDC is **economically zero**
The product can be terminated daily	»	Trade termination on pre-defined terms is part of the legal and digital contract

DZ BANK Gruppe

ERC-6123: Proposed Functionality for Trading & Settlement

function **inceptTrade** (*address* withParty, *string* tradeData, *int256* position, *int256* paymentAmount, *string* memory initialSettlementData)

function **confirmTrade** (*address* withParty, *string* tradeData, *int256* position, *int256* paymentAmount, *string* memory initialSettlementData)

function **initiateSettlement** ()

function **performSettlement** (*int256* settlementAmount, *string* settlementData)

function **afterTransfer** (*uint256* transactionHash, *bool* success)

function **requestTradeTermination** (*string* tradeId, *int256* terminationPayment)

function **confirmTradeTermination** (*string* tradeId, *int256* terminationPayment)

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Decentralization in multiple Aspects: Advantages for the Industry

– **Distributed Ledger Technology** enables full **Disintermediation**
  – Distributed Data Storage (Blockchain)
  – Distributed Code Execution (Smart Contracts)
  – Distributed Representation of Digital Claims (Tokenisation) and Currencies (CBDC)

– An **Open-Source Code** Base enables
  – Joined development of transparent and digital **Open Standards**
  – May accelerate the adoption of new Technologies

– The **SDC Protocol (ERC-6123)**
  – designs a digital Financial Product in all *four* Aspects (First Application: Derivatives)
  – can function frictionless based on settlement in CBDC

DZ BANK Gruppe

Demo, Open-Source-Code, Papers and Articles

Demo-Video: Historical Simulation of SDC-Concept during Lehman Crisis: https://youtu.be/JttCVZ-Wo7w

Open-Source-Code, Project Page

– SDC-Ethereum-Standard (ERC 6123): https://ercs.ethereum.org/ERCS/erc-6123

– GitHub-Repo (Bewertungsservice, Demo): https://github.com/finmath/finmath-smart-derivative-contract

– Project Page (Literatur, XML-Definition): https://www.finmath.net/finmath-smart-derivative-contract/

Whitepapers und Articles

– „Rethinking Financial Derivatives Inspired by Smart Contracts" https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3249430

– „Smart Derivative Contracts (original White Paper)": https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3163074

– „Implementing a Financial Derivative as a Smart Contract": https://arxiv.org/pdf/1903.00067.pdf

– „Outsmarting Counterparty Risk by Smart Contracts" https://www.risk.net/cutting-edge/views/7494071/outsmarting-counterparty-risk-with-smart-contracts

PoC - Press Releases / Articles:

– 2021: „German Financial Institutions Successfully Complete **First Trade of OTC Interest Rate Derivatives** Using Digital Smart Contract"
https://uk.practicallaw.thomsonreuters.com/w-031-7215?originationContext=document&transitionType=DocumentItem&contextData=(sc.Default)&firstPage=true

– 2022: „New digital standard: DZ BANK and Union Investment trade OTC derivative as smart contract"
https://www.dzbank.com/content/dzbank/en/home/we-are-dz-bank/press/news_archive/2023/new-digital-standarddzbankandunioninvestmenttradeotcderivativeas.html

Interconnecting Central Bank Money and Commercial Bank Money
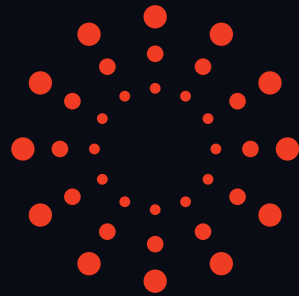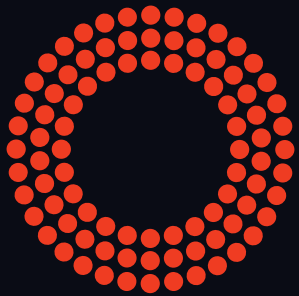
Use Case 1: Interlinkage of Central Bank Money (CeBM) and Commercial Bank Money (CoBM)

Background of Experiment:

- Bank 1, Bank 2, Customer 1 , and Customer 2 have wallets on a Markets DLT and/or a Central Bank DLT platform . (Alternatively, these may be 2 separate platforms where CeBM and CoBM are represented).

- For the purposes of this experiment, we assume only Bank 1 issues Deposit Tokens**.

- Both Bank 1 and Bank 2 hold EUR wholesale CeBM (wCeBM).

- Bank 1 and Bank 2 customers enter into a trade, or a simple payment transaction, where Customer 1 sends a EUR Deposit Token of Bank 1 to Customer 2 of Bank 2.

- Customer 1 and Customer 2 are whitelisted institutions and are authorised by Bank 1 and Bank 2 respectively to carry out these transactions.

Steps:

1   Customer 1 transfers Deposit Tokens to Customer 2 as a payment.

2   Customer 2 requests a redemption of Deposit Tokens from Bank 2. Deposit Tokens are transferred to Bank 2, and Bank 2 makes Customer 2 whole by depositing EUR on their off-chain bank account.

3   Bank 2 requests settlement of Deposit Tokens in wCeBM. Bank 1 sends wCeBM balance to Bank 2 versus Deposits Tokens.

DT1: Commercial Bank Money Deposit Tokens issued by Bank 1

* off-chain bank account at Bank 2

*For discussion purposes only. Deposit Tokens may be issued on a Market DLT Platform or Central Bank DLT platform.
** Deposit Tokens , sometimes also referred to as Commercial Bank Money Tokens, refer to transferable electronic records issued on a blockchain by a licensed depository institution (such as a commercial bank) which evidence a deposit claim against the issuer for a fiat cash amount denominated in a single currency.

2

ONYX by J.P.Morgan

Use Case 2: FX Settlement - EUR wCeBM vs USD Deposit Tokens

Background of Experiment:

- Bank 1 and Bank 2 have wallets on a Market DLT or a Central Bank DLT platform (wCeBM and CoBM may alternatively be represented on separate platforms).

- These Commercial Banks can hold both CoBM in the form of Deposit Tokens (either in USD or EUR) and also EUR wCeBM.

- For this experiment, we assume Bank 1 is the issuer of Deposit Tokens*.

Use case Scenario:

- Bank 1 has surplus EUR wCeBM whereas Bank 2 has surplus USD CoBM.

- Bank 1 and Bank 2 enter into an FX trade which enables the exchange of wCeBM and CoBM denominated in different currencies where settlement risk is mitigated due to a PvP.

Steps:

1. Bank 1 and Bank 2 settle their PvP FX transactions for EUR wCeBM vs USD Deposit Tokens (or USD Deposit Tokens vs EUR Deposit Tokens)
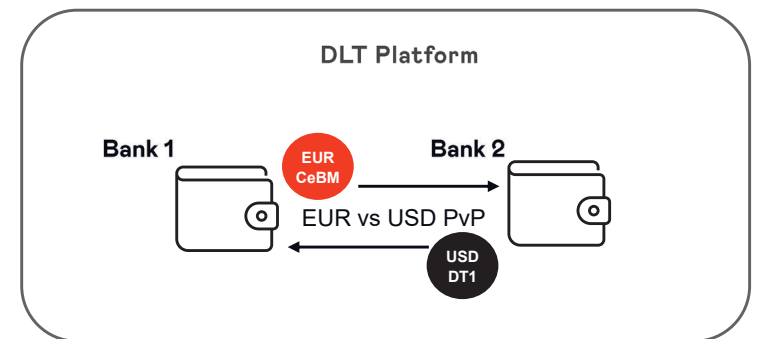
Payment vs Payment of Euro wCeBM and USD Deposit Tokens are made between Bank 1 and Bank 2 to settle their positions on an FX transaction.

DT1: Commercial Bank Money Deposit Tokens issued by Bank 1

* For discussion purposes only. Deposit Tokens may be issued on a Market DLT Platform or Central Bank DLT platform.

ONYX
by J.P.Morgan

Disclaimer

onyx
by J.P.Morgan

DekaBank / LBBW / SWIAT Use Cases

Eurosystem Exploratory Work for Wholesale Settlements
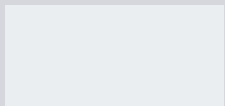
SWIAT at a Glance

Joint Venture

Deka, LBBW, Standard Chartered Bank
and Comyno as JV founding partners

Strong Team

+30 employees with longstanding
financial & blockchain experience

Goal

Attract new partners to create a market
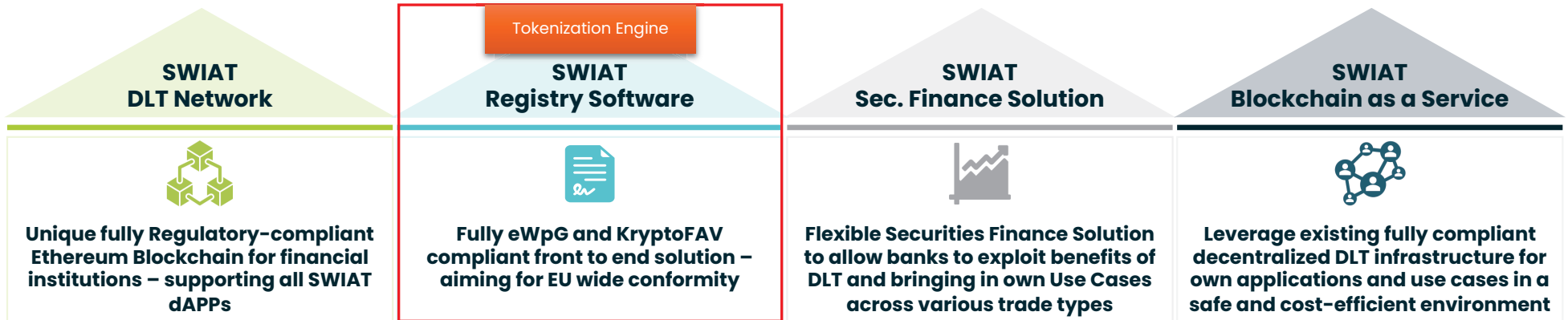consortium for Financial Institutions

Strategic Objective

Creation of a neutral, trustworthy, regulatory
compliant financial infrastructure

SWIAT provides a decentralized financial infrastructure and enables a frictionless, real-time
settlement environment across asset classes between different global jurisdictions

The pillars of SWIAT
SWIAT offers a whole ecosystem

swiat

SWIAT DLT Network	Tokenization Engine SWIAT Registry Software	SWIAT Sec. Finance Solution	SWIAT Blockchain as a Service
Unique fully Regulatory-compliant Ethereum Blockchain for financial institutions – supporting all SWIAT dAPPs	Fully eWpG and KryptoFAV compliant front to end solution – aiming for EU wide conformity	Flexible Securities Finance Solution to allow banks to exploit benefits of DLT and bringing in own Use Cases across various trade types	Leverage existing fully compliant decentralized DLT infrastructure for own applications and use cases in a safe and cost-efficient environment

Regulatory Conformity:

- Clear governance and roles & responsibilities tailored to Financial Institutions
- All participants are bound by the same contracts
- Easy adoption of individual bank processes and requirements
- Embedded legal and conduct framework to ensure compliance with bank regulations

Structural Features:

- Data Security & Privacy plays central role
- Designed to reduce dependencies from Intermediaries and keep direct client relationships
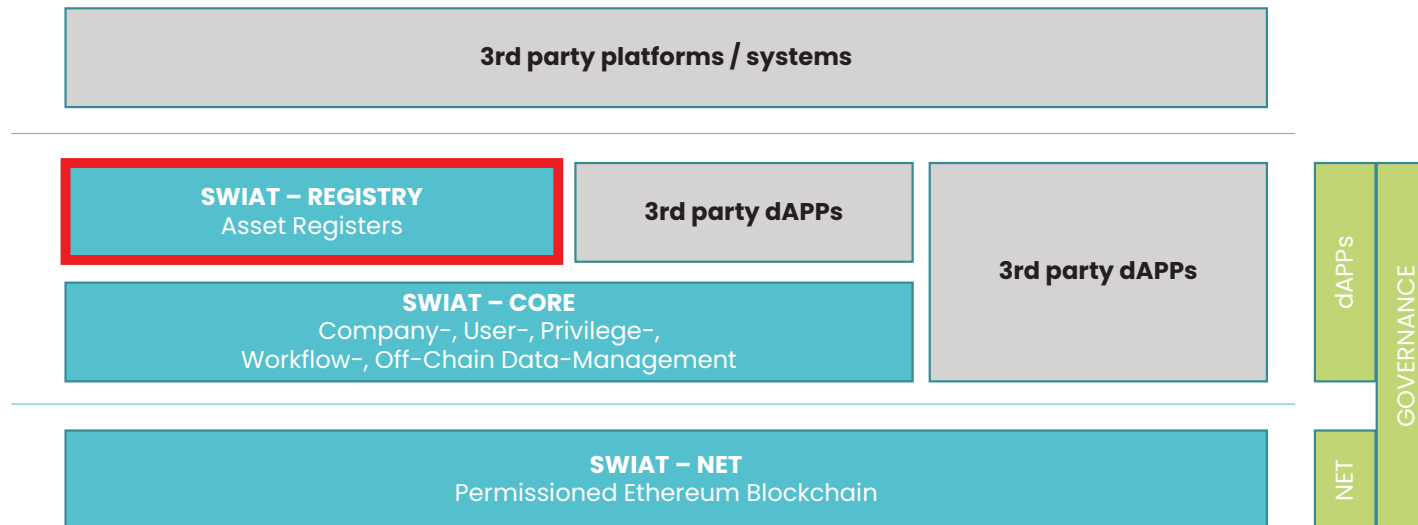- Easy to integrate into existing bank front and back-office systems
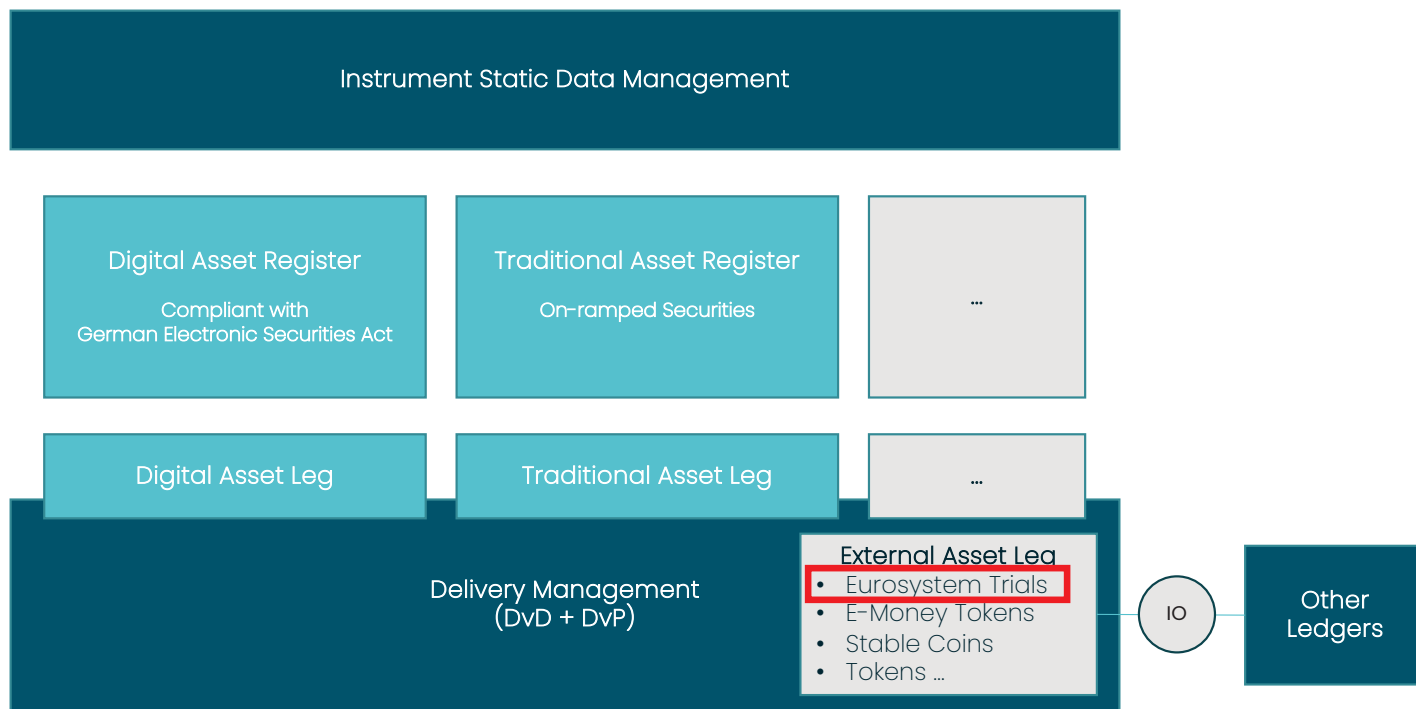- While owned by banks – platform is designed as open architecture to allow for cooperation and competition – "Co-opetition".

SWIAT Architecture Overview

SWIAT REGISTRY

Instrument Static Data Management

Digital Asset Register

Compliant with
German Electronic Securities Act

Traditional Asset Register

On-ramped Securities

...

Digital Asset Leg

Traditional Asset Leg

...

Delivery Management
(DvD + DvP)

External Asset Leg
- Eurosystem Trials
- E-Money Tokens
- Stable Coins
- Tokens ...

IO

Other Ledgers

Why are we participating in the exploratory work and what do we want to validate?

swiat

DLT as the new architectural and social paradigm for building platforms that support collaborative competition (a.k.a. co-opetition)

1. Collaborate and share at infrastructure level
2. Compete at business level

The "whole product" for Digital Assets in the institutional setting requires:

1. Distributed Ledger Technology   (ready)
2. Primary Market (Issuers, Registrars, Investors)   (ready)
3. DvP with CeBM   (todo)   ← the reason we (all) are here
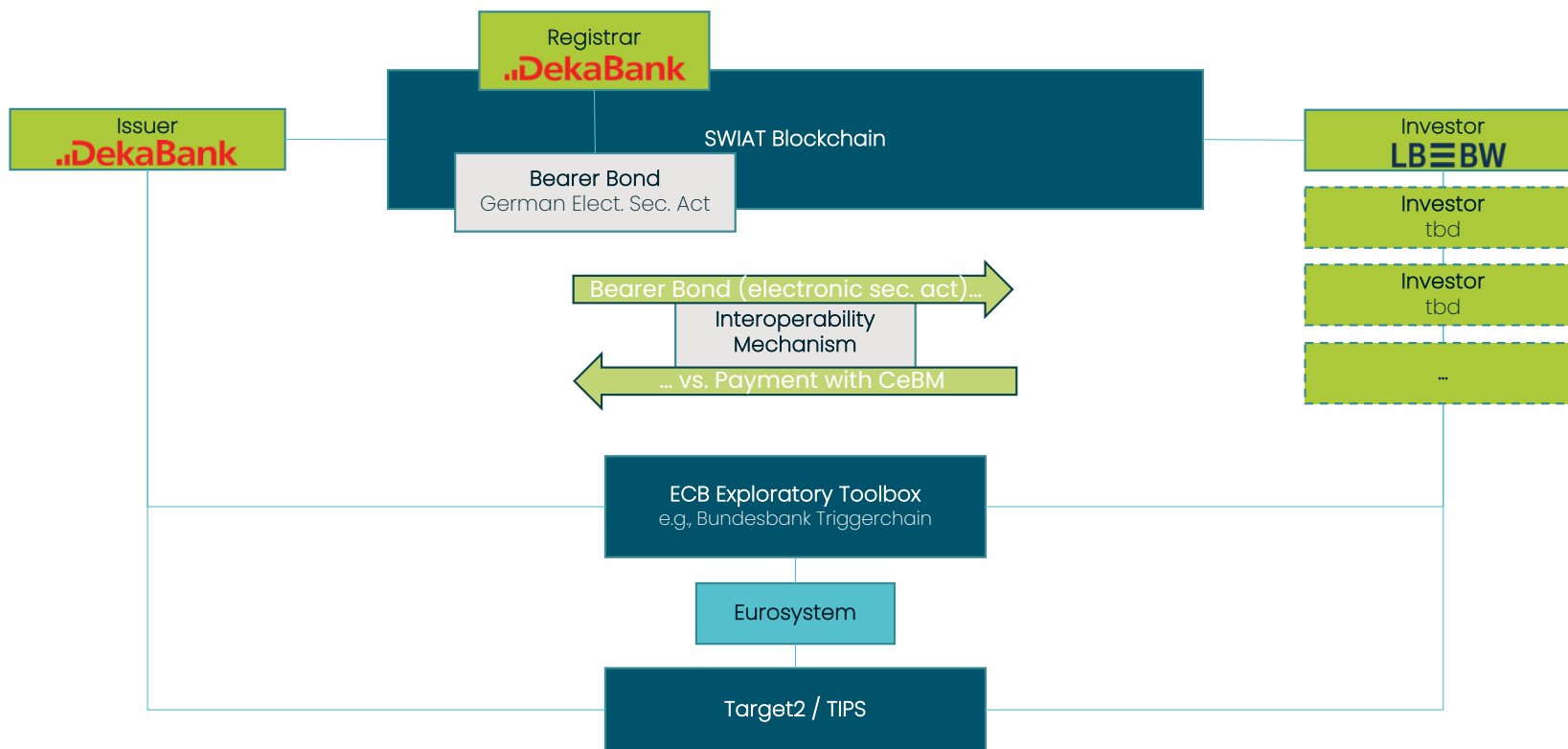4. Secondary Market   (todo)

What do we want to validate?

1. Cross-Ledger DvP with CeBM works.
2. It is reliable, robust and it can be scaled.
3. It can be integrated into existing banking processes.
4. It can be automated.
5. It is reusable in other settings, e.g. with CoBM, E-Money Tokens, Stable Coins, etc..
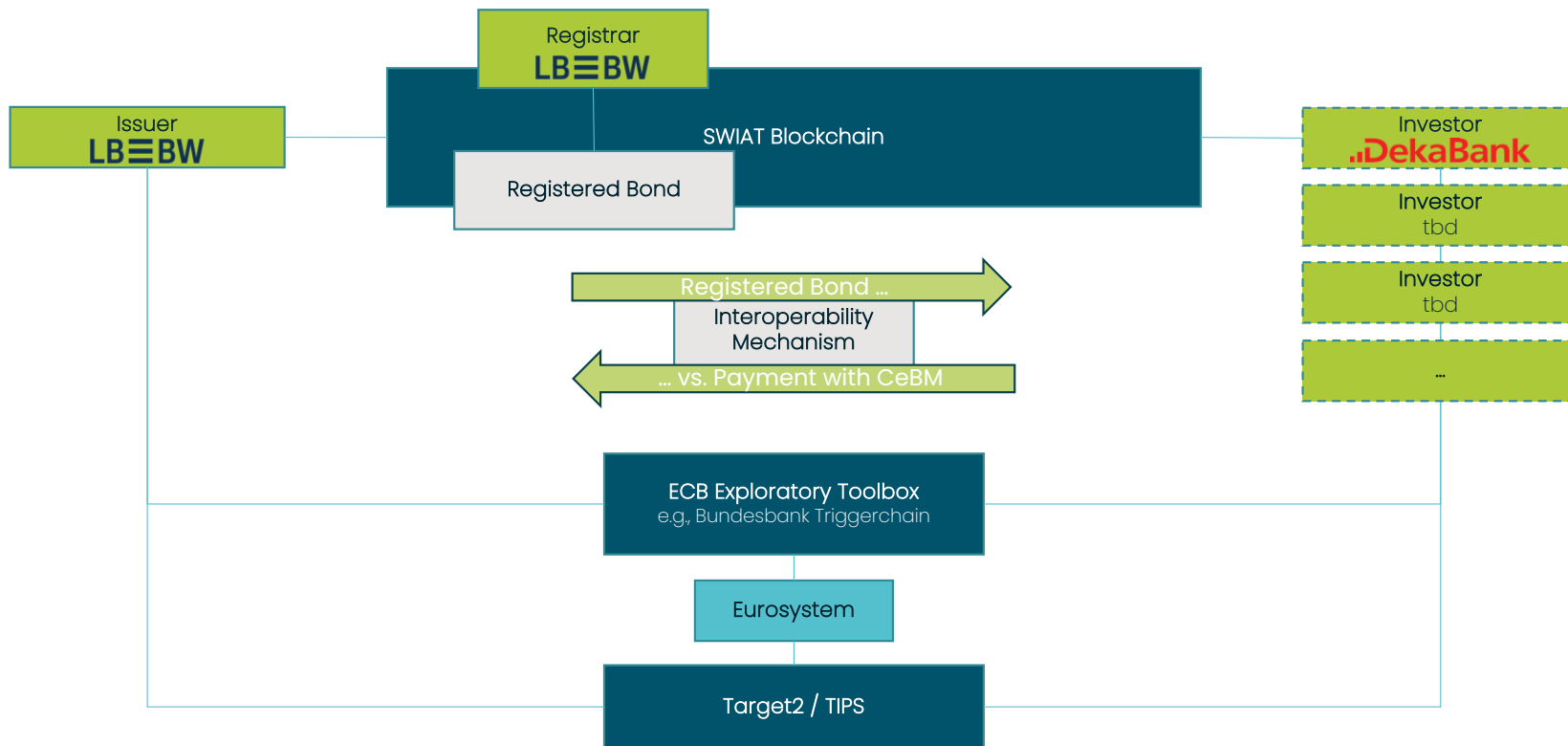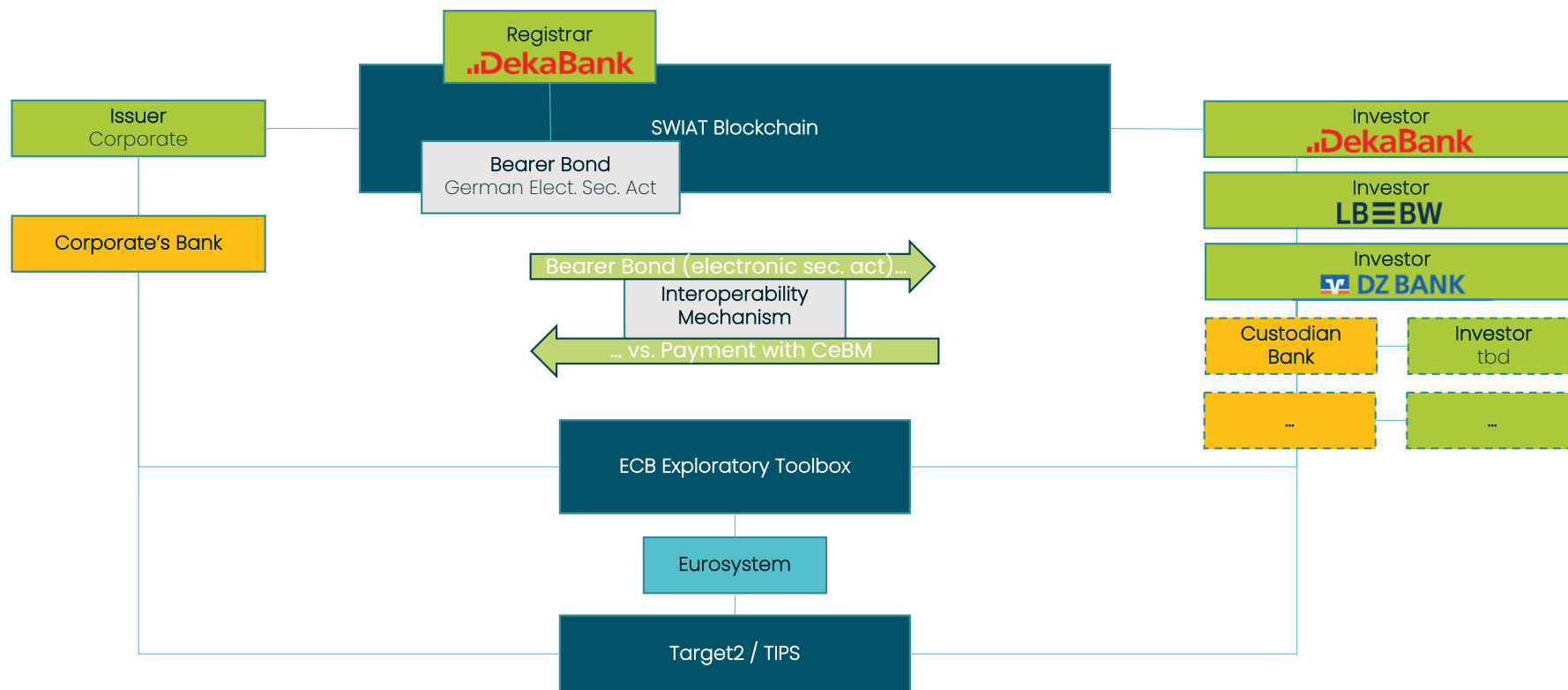
Integration Blueprint
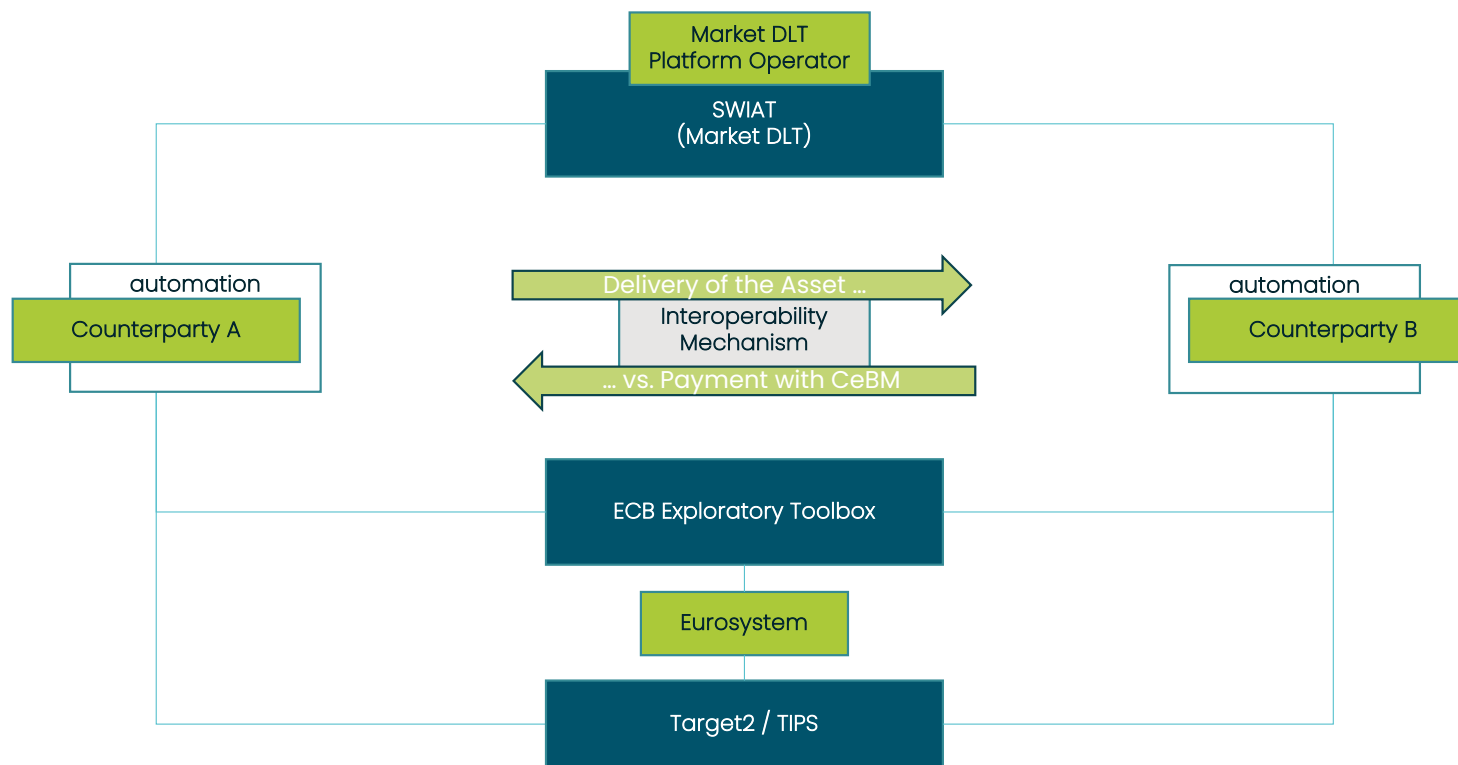
Use Case Ia
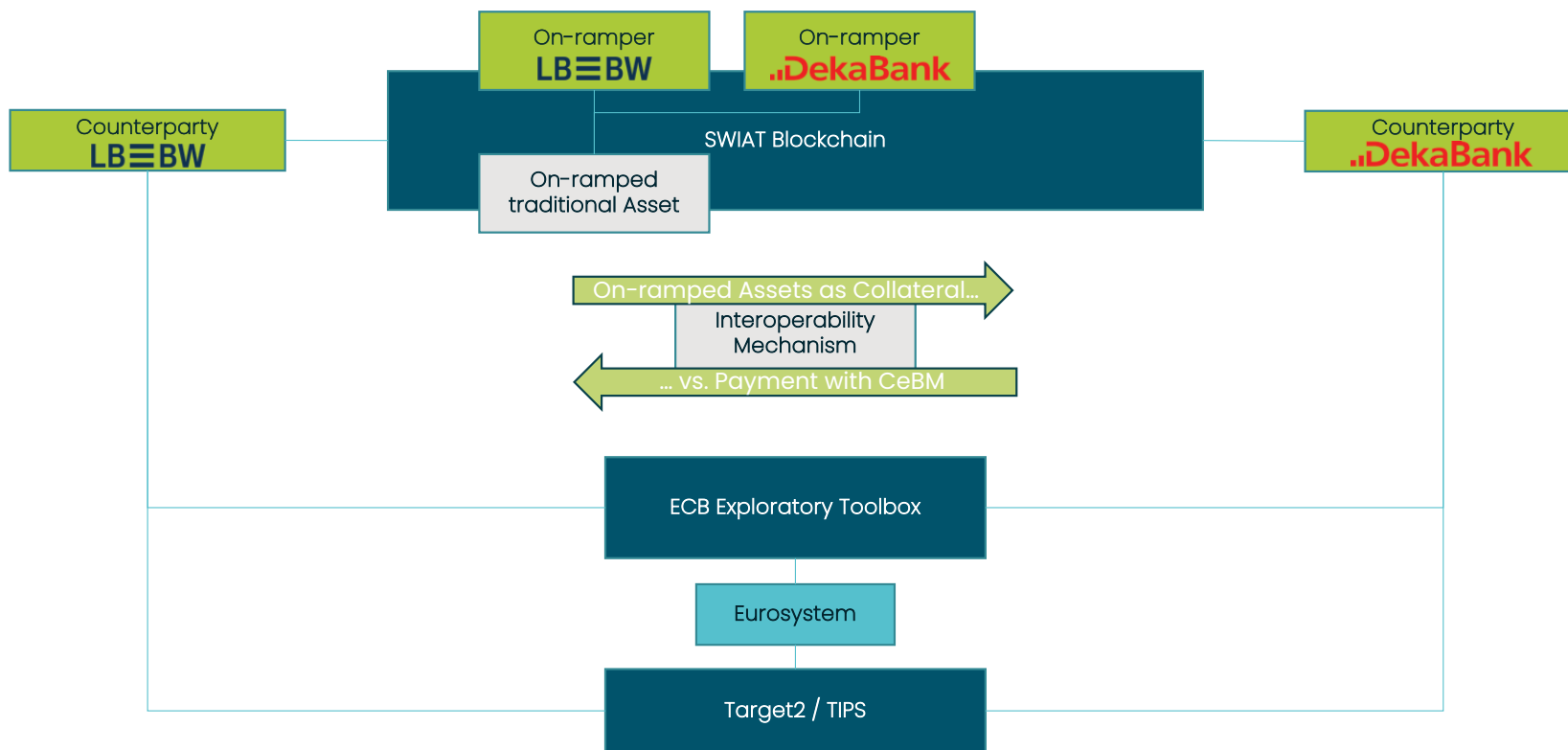# Bearer Bond Issuance (institutional)

Use Case Ib
Registered Bond Issuance (institutional)

Use Case II
Bearer Bond Issuance (corporate)

Registrar
.ıDekaBank

Issuer
Corporate

SWIAT Blockchain

Bearer Bond
German Elect. Sec. Act

Investor
.ıDekaBank

Investor
LB≡BW

Corporate's Bank

Investor
DZ BANK

Bearer Bond (electronic sec. act)…

Interoperability Mechanism

… vs. Payment with CeBM

Custodian Bank

Investor
tbd

...

...

ECB Exploratory Toolbox

Eurosystem

Target2 / TIPS

Use Case III
Repurchase Agreement

Disclaimer

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