











Banking on Blockchain in Europe

International Reconciliation based on DLT

Agenda (27/01/22 - 17:00-18:30h - digital session)

0.	Welcome		M. Schuck	5m
1.	Opening DLT-based Banking – Status Quo		P. Sandner	10m
2.	DLT-based Intra-Banking in Germany			
2.1	Supranational perspective		M. Schmudde	10m
2.2	Market Participant's perspective		P. Kohl-Landgraf	10m
3.	Spunta Banca – DLT-based Interbank Reconciliation			
3.1	Italian Banking Market Solution – Supranational perspective		P. Giucca	10m
3.2	The Spunta Banca Solution – Founder perspective		S. Attanasio R. Stasi	15m
4.	Cross-Border <i>Blockchain</i> based Interbank Business		B. Matten (Host)	30m
	The Way to Go: Challenges and Perspectives for German Market (Panel Discussion / Q&A)	   	R. Stasi P. Sandner M. Schmudde P. Kohl-Landgraf	

List of speakers

Silvia Attanasio	<ul style="list-style-type: none"> • Head Of Innovation @ABI – Italian Banking Association • Member of Digital-€ Market Advisory Group @ECB & BC Expert Policy Advisory Board @OECD 	
Paola Giucca	<ul style="list-style-type: none"> • Deputy Head Retail Payment Instruments and Services Directorate @Banca d'Italia 	
Benjamin Matten	<ul style="list-style-type: none"> • Technology Innovation Evangelist at the CTO Team @NTT DATA • Chairman of the board – Blockchain working group @BITKOM e.V. 	
Peter Kohl-Landgraf	<ul style="list-style-type: none"> • Senior Business Analyst Capital Markets Trading @DZ Bank 	
Prof. Dr. Philipp Sandner	<ul style="list-style-type: none"> • Head of Blockchain Center @Frankfurt School of Finance & Management • FinTech Council (FinTechRat) @German Federal Ministry of Finance 	
Matthias Schmudde	<ul style="list-style-type: none"> • Head of Payment and Securities Clearing and Settlement Division @Deutsche Bundesbank 	
Manfred Schuck	<ul style="list-style-type: none"> • President @Frankfurt Payment Network e.V. • Chief Executive Officer / Co-Owner @S&S Marketing GmbH 	
Romano Stasi	<ul style="list-style-type: none"> • Managing Director @ABI Lab – Research & Innovation Center promoted by Italian Banking Association • Chief Operating Officer @CERTFin 	

DLT-based banking: Aspects of the digital euro and tokenization of assets



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Frankfurt School of Finance & Management
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Prof. Dr. Philipp Sandner
Head of Frankfurt School
Blockchain Center



WHAT WE DO

The Frankfurt School Blockchain Center was **founded in 2017** by Professor Philipp Sandner. We are a **think tank and research center** which investigates implications of the blockchain technology for companies and their business models.



Prof. Dr. Philipp Sandner
Frankfurt School Blockchain Center
Mail: p.sandner@fs.de

- Head of the **Frankfurt School Blockchain Center (FSBC)**
- Professor at the faculty of the Frankfurt School of Finance & Management
- Board of Directors of **21e6 Capital**, **FiveT Fintech Fund** and **Blockchain Founders Group**
- **Member of the Fintech Council** (FinTechRat) of Germany's Federal Ministry of Finance
- Blockchain technology in general, crypto assets such as Bitcoin and Ethereum, the digital programmable Euro, tokenization of assets and rights, digital identity.

OUR PARTNERS

COMMERZBANK 

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European Blockchain Labs

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 **SettleMint**

 **intas.tech**

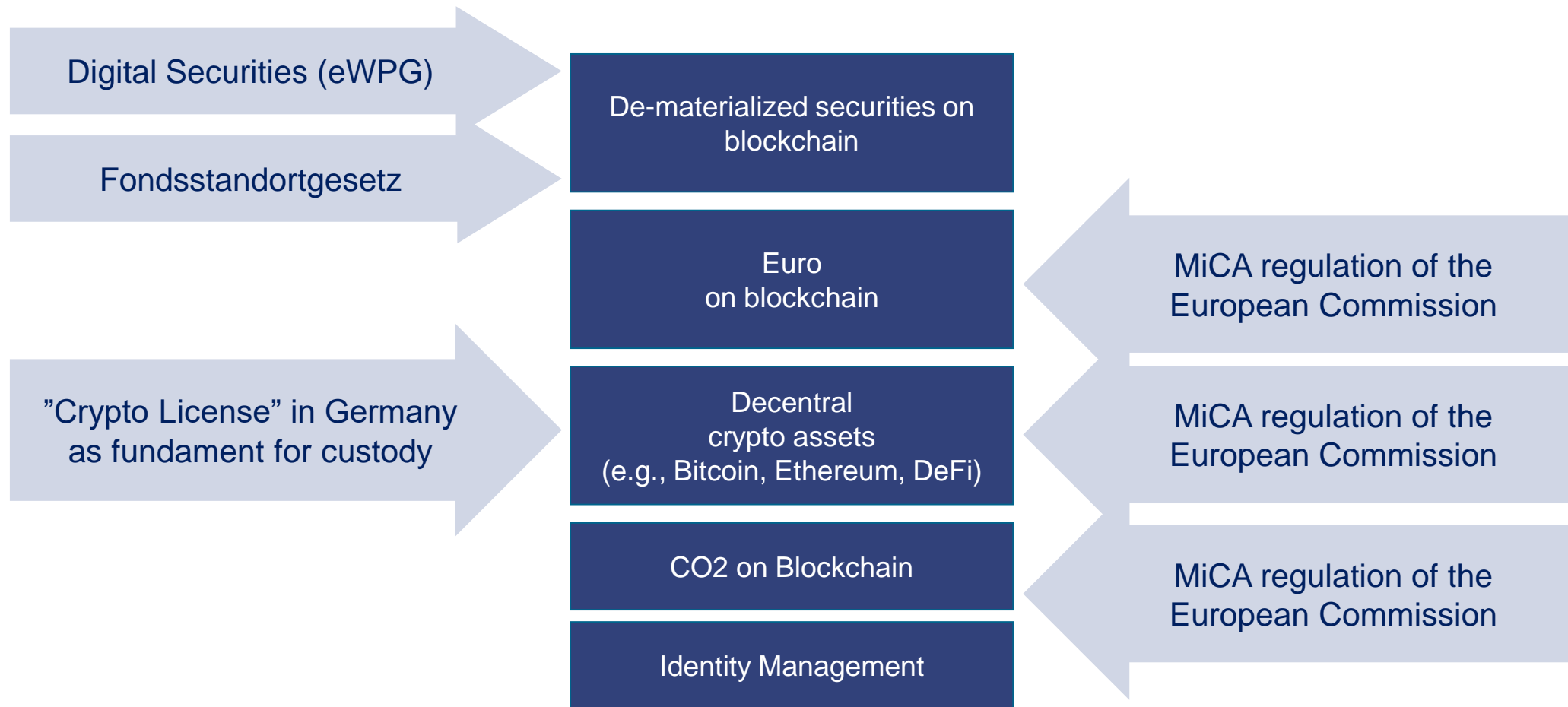
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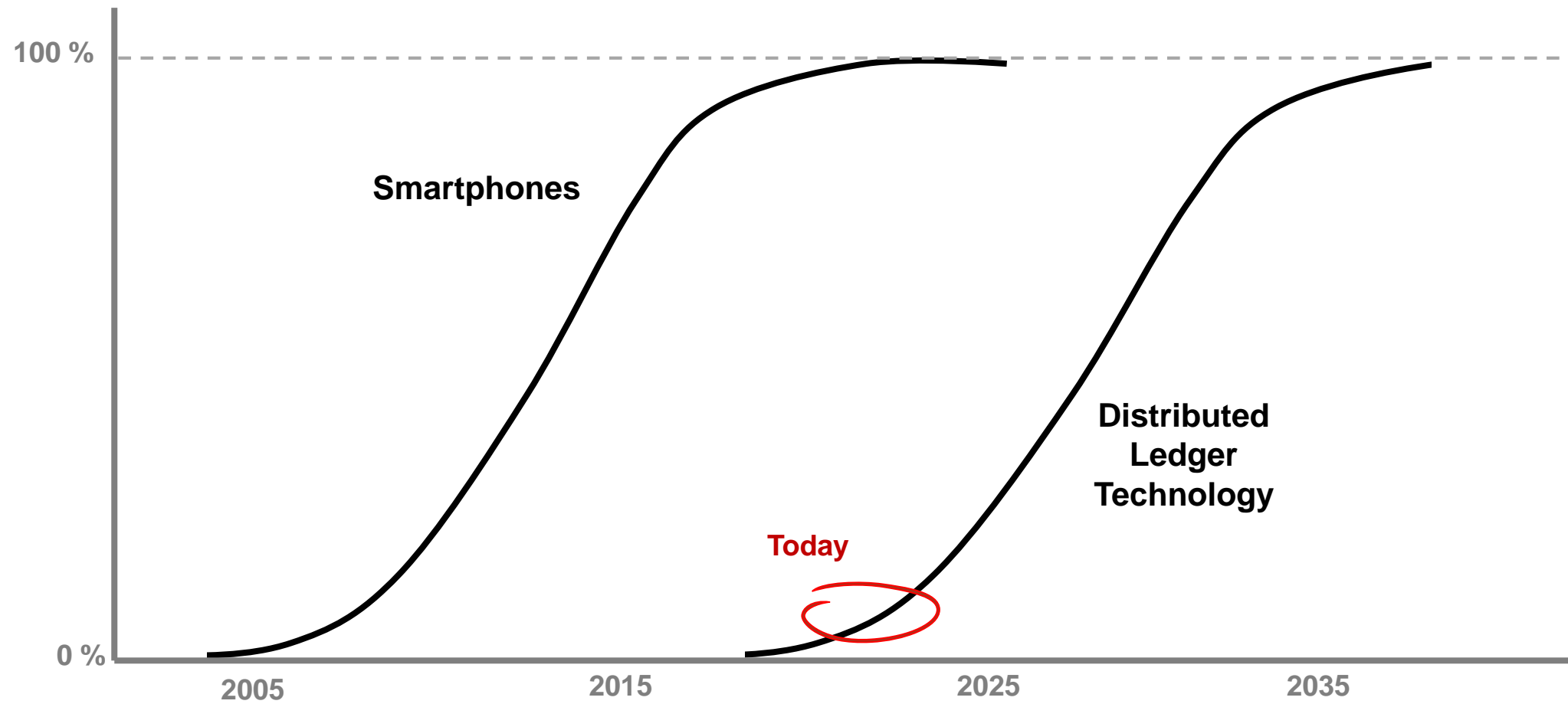
METACO

CAPCO

**Blockchain
Founders
Group**

DEC | DLT EDUCATION
CONSORTIUM





An aerial photograph of a city skyline, featuring several prominent skyscrapers. The image is overlaid with a semi-transparent blue filter and a white network diagram consisting of interconnected nodes and lines, suggesting a digital or technological theme. The text "Digital euro" is centered in the image in a white, sans-serif font.

Digital euro

From a normative perspective, which digital money solutions could be applied in various domains?

	Main Driver	Retail and Merchants	Industrial Payments	Capital Market	International (With KYC)	International (Without KYC) ¹
Traditional Solution						
Physical Cash	Central Banks	Yes	No	No	No	Yes
Payment via deposits	Commercial Banks	Yes	Yes	Yes	Yes	No
Digital Money Solution						
CBDC	Central Banks	Yes	Yes	Yes	Yes	More likely no
Trigger Solution	Commercial Banks	No	Yes	Yes	Yes	No
Stablecoins	Financial Companies as Issuers	Yes	More likely no	More likely no	More likely no	Yes

Source: Sandner/Gross (2022)

Notes: ¹ Includes the entire space of Decentralized Finance (DeFi) in a peer-to-peer manner

When can we expect significant volumes for these digital money solutions in specific application domains?

	Relevance for Euro	Main Driver	Retail and Merchants	Industrial Payments	Capital Market	International (With KYC)	International (Without KYC) ¹
CBDC	€	European Central Bank	≥2026	Not in focus	Not in focus	Not in focus	Not in focus
	\$	Federal Reserve	Focus unclear	Focus unclear	Focus unclear	Focus unclear	Focus unclear
	¥	People's Bank of China	≥2022	Not in focus	Not in focus	≥2023	Not in focus
Trigger Solution	€	Commercial Banks; Deutsche Bundesbank	Not in focus	≥2022	≥2023	Not in focus	No
Stablecoins	€	Basically no significant projects	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
	\$	Private Issuers Partly Regulated	≥2022	Not in focus	Not in focus	Not in focus	≥2019

Source: Sandner/Gross (2022)

Notes: ¹) Includes the entire space of Decentralized Finance (DeFi) in a peer-to-peer manner

Which solutions for the digital euro can we expect, and when?

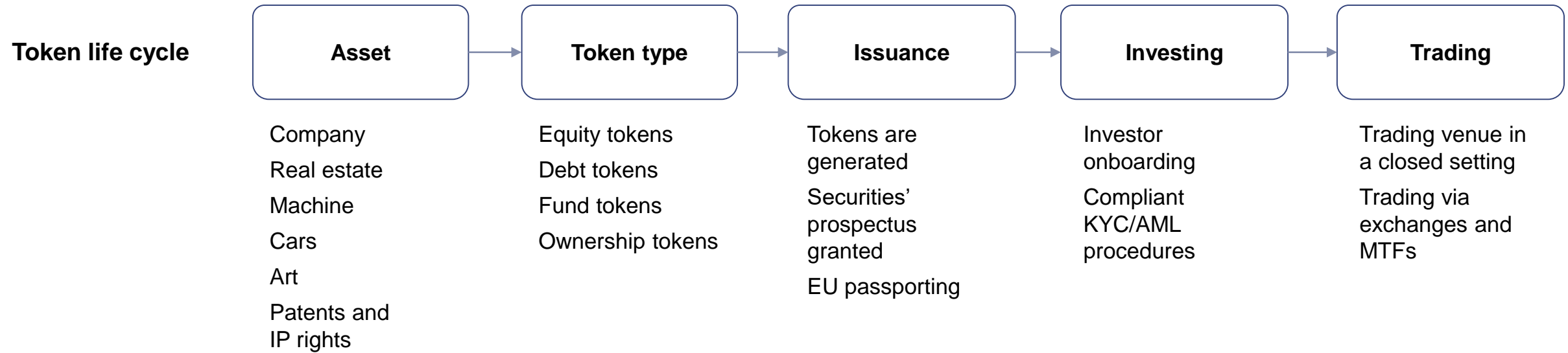
	Main Driver	Retail and Merchants	Industrial Payments	Capital Market	International (With KYC)	International (Without KYC) ¹
CBDC	European Central Bank	≧2026			≧2026	
Trigger Solution	Commercial Banks; Deutsche Bundesbank		≧2022	≧2023		
Stablecoins	None					

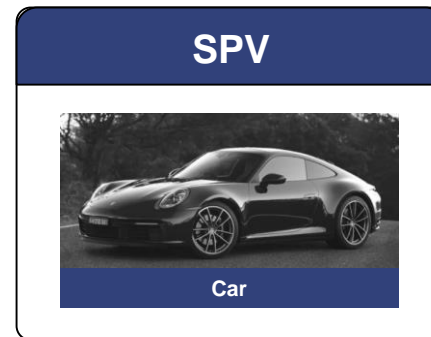
Source: Sandner/Gross (2022)

Notes: ¹) Includes the entire space of Decentralized Finance (DeFi) in a peer-to-peer manner

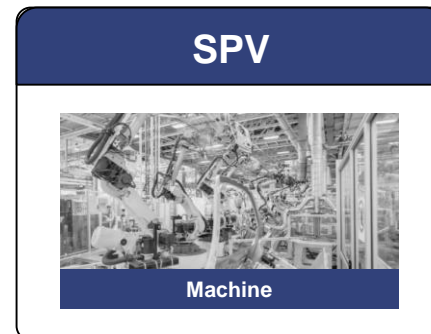
An aerial photograph of a city skyline, featuring several prominent skyscrapers. The image is overlaid with a semi-transparent blue filter and a white network diagram consisting of interconnected nodes and lines. The word "Tokenization" is centered in a large, white, sans-serif font.

Tokenization







Equity tokens: This asset represents x equity tokens. Investors do own a share of the entity and thereby indirectly a piece of the asset.




Debt tokens: This asset represents x debt tokens (e.g. flexible interest rate). Investors do not own the asset neither do they own equity.


Source: Amazing Blocks AG (2020)

Tokenization creates new asset classes and revolutionizes existing ones

	Bankable assets
	<ul style="list-style-type: none">• Stocks, profit participation certificates, currencies, bonds• Can be directly created on the Blockchain• Not necessarily backed by real assets• Issuers must be trusted that value is behind the asset


Tokenization creates new asset classes and revolutionizes existing ones

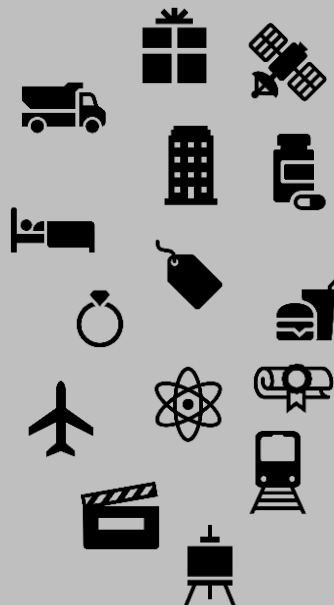




Liquid assets

- Stocks, profit participation certificates, currencies, bonds
- Can be directly created on the Blockchain
- Not necessarily backed by real assets
- Issuers must be trusted that value is behind the asset





Private assets

- Any kind of real assets (real estate, art, patents, certificates, coupons, cars)
- Ownership can be fractionalized and fungibility of asset is created
- Increase efficiency, enhance trust, reduce costs



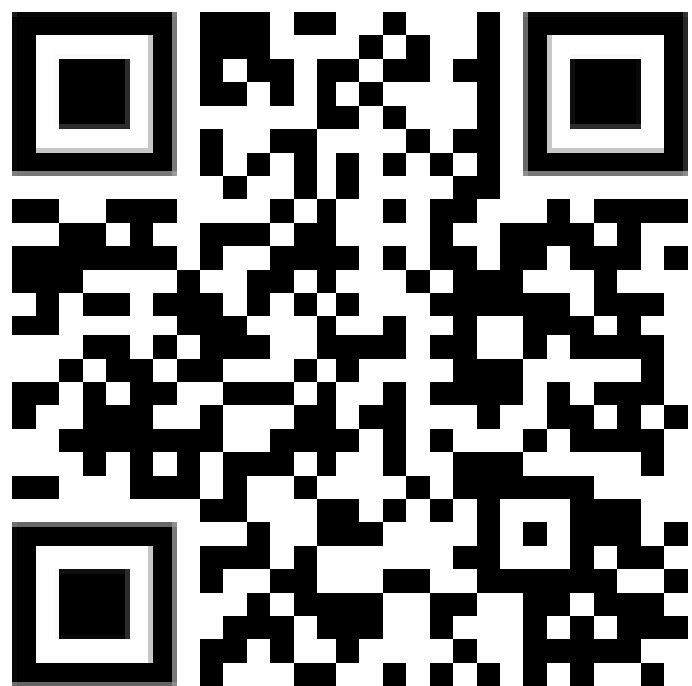
Prof. Dr. Philipp Sandner

Please feel free to contact me via mail (p.sandner@fs.de), LinkedIn or Twitter ([@philippsandner](https://twitter.com/philippsandner))

- Head of the Frankfurt School Blockchain Center (FSBC)
- Board of Directors of 21e6 Capital, FiveT Fintech Fund, and Blockchain Founders Group

LinkedIn





Current position

- Professor at the faculty of the Frankfurt School of Finance & Management
- Head of the Frankfurt School Blockchain Center (FSBC)

Memberships and affiliations

- Member of the Fintech Council (FinTechRat) of Germany's Federal Ministry of Finance
- Member of the EU Blockchain Observatory established by the European Union
- Co-founder of the German Blockchain Association, the International Token Standardization Association (ITSA), the Multichain Asset Managers Association

Expertise

- Blockchain technology in general, crypto assets such as Bitcoin and Ethereum, the digital programmable Euro, tokenization of assets and rights, digital identity.

Experience and education

- Board of Directors of 21e6 Capital, FiveT Fintech Fund, and Blockchain Founders Group
- Advising financial organizations, industrial corporations and startups concerning their blockchain activities
- Research fellow at the Technical University Munich, the Ludwig-Maximilians-University Munich and the Berkeley Center for Law & Technology
- Studies of business administration focusing on computer science at the University Mannheim, Copenhagen Business School
- Co-founder of a consulting company specialized in the area of innovation strategy, IP and technology transfer

Awards and prizes

- Ranked as one of the "top 30" economists by the Frankfurter Allgemeine Zeitung (FAZ), a major newspaper in Germany, from 2018 until 2021
- "Top 40 under 40" ranked by the German business magazine Capital
- Awarded with several scholarships and research prizes

Publications

- Publications in international peer-reviewed journals such as Administrative Science Quarterly, Research Policy, the Journal of Marketing Research and the Journal of Business Venturing
- Editor of two books; one book focuses on the implications of blockchain technology on companies, the other one focuses on the implications for the society. More: www.die-blockchain.ist/die-zukunft/

Frankfurt School Blockchain Center

- Analyzing the implications of blockchain technology on companies and business models
- Providing a platform for decision makers, startups, technology experts and industry professionals to exchange their knowledge and share their visions

DLT based Intra-Banking

Supranational perspective

Matthias Schmudde, Deutsche Bundesbank

Distributed Ledger Technology

Basic technology for smart economy

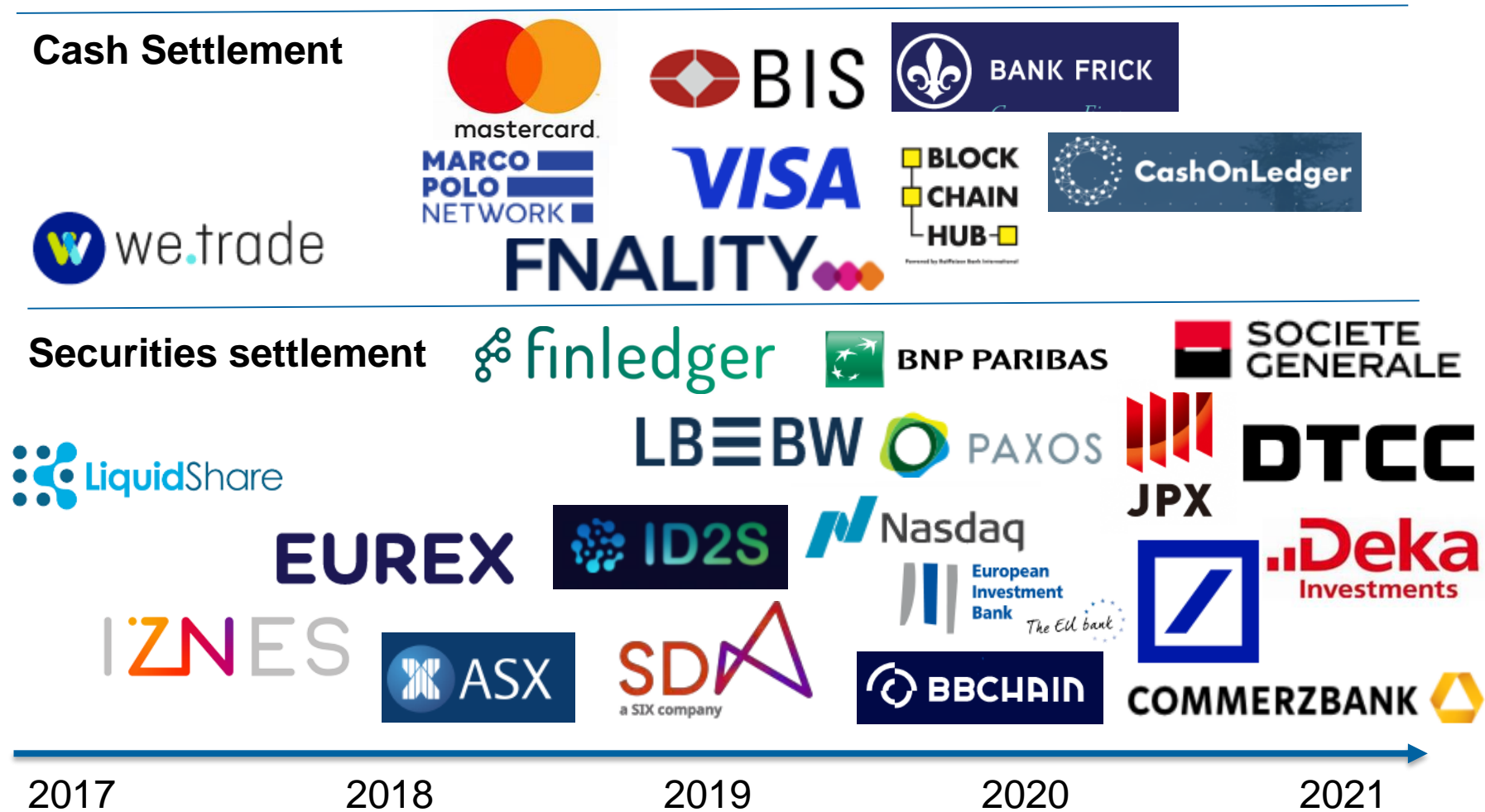
- The DLT could help creating a smart economy
- Benefits of DLT
 - Redundancy of reconciliation due to joint data base
 - Smart contracts could support the automated settlement of pre-defined contracts based on conditions (faster, cheaper, more reliable => less transaction costs).
- The payment method should be part of the overall process of settlement.



In a smart economy a synchronized flow of goods and money should be facilitated to the largest extent possible without foregoing stability.

DLT market initiatives landscape

Financial markets



DLT market initiatives landscape

Real economy



Machine-to-Machine

Fully automated settlement between devices

- electric car pays independently for the charging station at the car park
- train pays station fee to the railway station



Pay-per-Use

Direct payment of an amount depending on consumption/use

- streaming platform charges individual price based on actual use
- leased machine charges a price measured in units of use and processes the payment independently



Internet of Things

Smart Payments in the internet of things (IoT), which can be initiated by interaction with the end customer, unlike M2M payments

- paying the neighbours for the shared use of their photovoltaic system
- payment for partial consumption from an energy network



SIEMENS



LB BW



Financial markets and real economy trends

Use cases induce smart solutions for digital money



Many financial service providers, clearing and settlement institutions, and fintechs are actively investigating DLT use cases

Real economy use cases are evolving as well with demand for suitable cash settlement services

Many institutions started proof-of-concepts – mainly in the field of securities settlement or cash settlement

Consortia and joint-ventures for cooperative research and development

Benevolent legislation process facilitating the tokenization of assets

Digital money

Initial problem

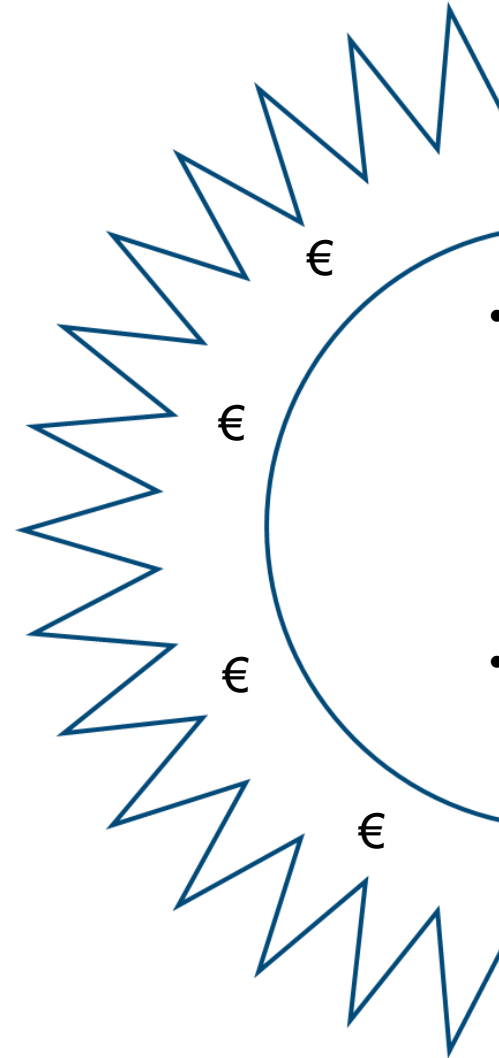
Smart Economy

- Usage of DLT is increasing
- Smart contracts can automate the execution of contracts
- **But:** Smart contracts need digital money for settlement



Payment systems

- Current payment systems offer safe and efficient settlement in central bank or commercial bank money
- **But:** No option of executing smart contracts in conventional payment systems



How to settle the cash leg of DLT based transactions?

Digital money

Options



Report

Tokenised commercial bank money

- **Suitable** payment solution under the assumption of a stable, secure and interoperable standard solution
- **Limited** to deposit insurance schemes

Central bank digital currency

- **Suitable** payment solution under the assumption of a stable, secure and interoperable standard solution
- **Fail-safe** by definition

Private crypto token (e.g. Ether) and stable coins (e.g. Diem)

- Technically capable
- Practically **unsuitable**
 - Limited interoperability
 - High volatility
 - Legal uncertainty

Trigger solution

- **Suitable** for smart contracts
- Same message types as conventional payment systems
- Related **limitations**

← Private solution

Public solution →

Digital money

Bundesbank's role

Committee on Payments
and Market Infrastructures



Principles for Financial Market
Infrastructures (PFMIs),
Principle 9:

*An FMI should conduct its
money settlements in central
bank money, where
practical and available, to avoid
credit and liquidity risks.*



EUROPEAN CENTRAL BANK

EUROSYSTEM

Digital euro

- Investigation phase
- Supplement to cash
- Risk free central bank money
- DLT-suitability under investigation



DEUTSCHE
BUNDESBANK
EUROSYSTEM

Trigger solution

- Proof of Concept
- Supplement to TARGET
Services
- Risk free central bank money
- Suitable for DLT-based
transactions

Thank you for your attention!



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Smart Derivative Contract

Looking beyond a recent Proof of Concept

Banking on Blockchain in Europe

Market Participants Perspective

27.01.2022, Peter Kohl-Landgraf, DZ BANK

A Product Innovation enspired by new Technologies

Smart Derivative Contract (SDC)

- Design of an entirely self-processing OTC derivative
- Fully deterministic post-trade concept without any human discretion
- Detach bilateral OTC transactions from counterparty credit risk
- Agnostic methodology: SDC as a process and product innovation

Proof of Concept (2021)

- Legal binding, NPP-compliant transaction between DZ BANK and BayernLB
- Six trading days, two offsetting 10Y IR-Swaps, 1Mio EUR notional each
- Automated processing and premature termination
- Distributed service infrastructure, Deutsche Börse acting as account manager

Lessons learned



Technical aspects

- Platform agnostic design
- Scope of DLT usage



Legal and documentation

- Common terminology
- „Code is part of the law“



Procedural and regulatory landscape

- Minimal invasive approach
- Fit of regulatory risk models



Organisational aspects

- Interdisciplinary team building
- Think from outside to inside

Outlook



SDC

- Usage of a Stable Coin versus CBDC prototype
- Valuation Oracles and usage of market data
- Extension of the concept to other OTC derivatives (e.g. FX, Eq)
- Vision of a decentralised and distributed service eco system
- Further questions: sdc@dzbank.de



Beyond

- Full potential when external and internal process chains can be redesigned
- Desirable: Platform for common elaboration and fast piloting
- Open source collaboration if applicable
- Take new technological developments as an inspiration to rethink existing business models or even try to build new ones

Spunta Banca – DLT-based solution

Italian Banking Market Solution – Supranational perspective

Paola Giucca

Deputy Head Retail Payment Instruments and Services

Banca d'Italia



BANCA D'ITALIA

The Spunta Project

- private permissioned DLT-based project for interbank reconciliation, promoted by ABI, coordinated and implemented by ABI Lab, the banking research and innovation centre
- to address a labour-intensive and time-consuming back office reconciliation process of bilateral accounts (like nostro and vostro accounts), in order to clear mismatches in double-entry book-keeping
- DLT application is not always the best solution and it has to be evaluated on the basis of the business model: ***spunta was the ideal candidate for automation through blockchain technology to make interbank reconciliation faster and more transparent***

full visibility of transactions, rapid management of flows with daily (rather than monthly) reconciliation, shared rules for the symmetrical reconciliation of transactions between counterparty banks....

The Project in the Bank of Italy perspective

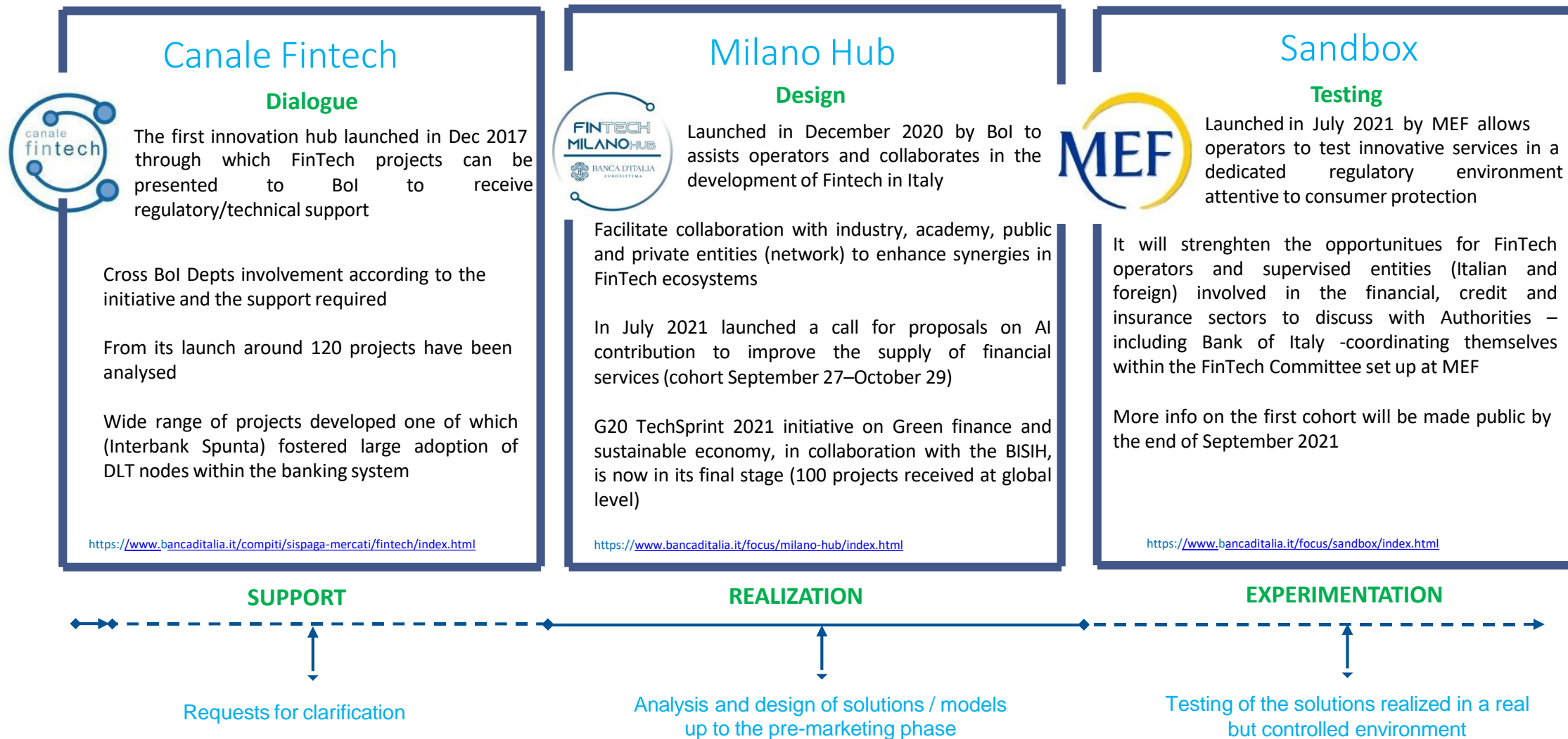
- the project was presented at our former (and unique) Innovation hub – FinTech Channel, analysed and discussed under the different institutional angles (Oversight, Supervision, IT)
- it appeared to be a very promising experiment on the use of DLT technology both in reshaping the process and in developing a new infrastructure based on permission services, nodes, rules and governance
- in a relatively simple and clearly defined context
 - Spunta is a niche interbank process not involving final customers
 - its use case may open towards new DLT application

We shared the interest of our banks in improving the understanding on a promising but still immature technology (DLT) and on potential benefits it may open (standardisation, certainty, transparency)

Lessons learned

- While not relevant in the supervisory dimension, from an oversight perspective Spunta opens new opportunities for efficiency gains and the potential to leverage them to further improvements
- Spunta also confirmed the relevance of an active collaboration with the market operators for the development of successful FinTech initiatives both in the interest of the payment and financial system and the financial market itself
- Both at domestic and cross-border level

Bank of Italy and the *Innovation Facilitators Chain*



Supranational perspective

- based on the experience so far gained at national level, active collaboration for the development of Spunta DLT-based solutions for interbank reconciliation at supranational level could potential match interest of other banking communities
- Central banks are also increasingly active in discussing and investigate DLT-based solutions also for the settlement of the cash leg tokenized assets in central bank money
- Banca d'Italia and Deutsche Bundesbank recently shared their experiences in this field

<https://www.bundesbank.de/en/press/press-releases/banca-d-italia-and-deutsche-bundesbank-discuss-initiatives-for-dlt-based-asset-settlement-in-central-bank-money-879634>

The Spunta Banca Solution – Founder perspective

Banking on Blockchain in Europe

ABI Lab at glance: what we do

ABI Lab is the Research and Innovation Centre promoted by the Italian Banking Association (ABI) that provides thought leadership through its **research in the area of banking and financial services**.

Consisting of **122 banks** and **70 ICT partners**, the Consortium main purpose is to foster collaboration between banks and ICT companies on innovative technology to strengthen the efficiency of the financial services.

Through its **Centres of Excellence**, ABI Lab conducts primary research in key areas including **Blockchain/DLT**, Digital Transformation, Fintech, Cybersecurity, AI, IT&Operations and Sustainable banking Transition.

Centres of Excellence



Innovating the Italian banking sector with DLT

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 Banking Research and Innovation Centre.

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, SIA is also a technical partner of the project.



In March 2020 the DLT-based system was fully implemented across the Italian banking sector.



The use case: “Spunta”

The key features of the blockchain, **immutability, security and transparency**, enabled addition of significant value for several sectors. This drove us to identify a suitable and relatively **easy use case to test its effectiveness**. In the interbank reconciliation process (“Spunta”), a niche back office process, we saw an excellent opportunity to embark on this journey.



CONS

- **Small process**: the Spunta process is small, even in terms of business, with small benefits
- **IT pervasive process**: every optimisation that we could imagine requires changes to the legacy systems that generate the transactions

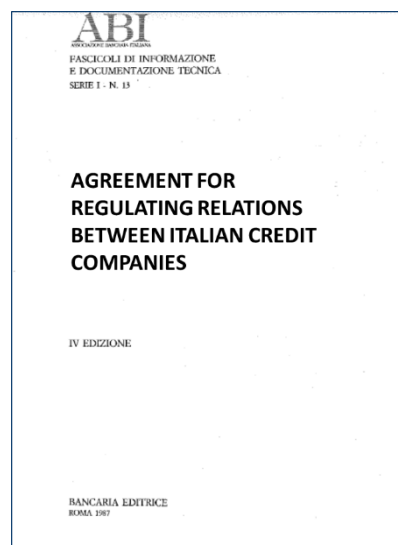
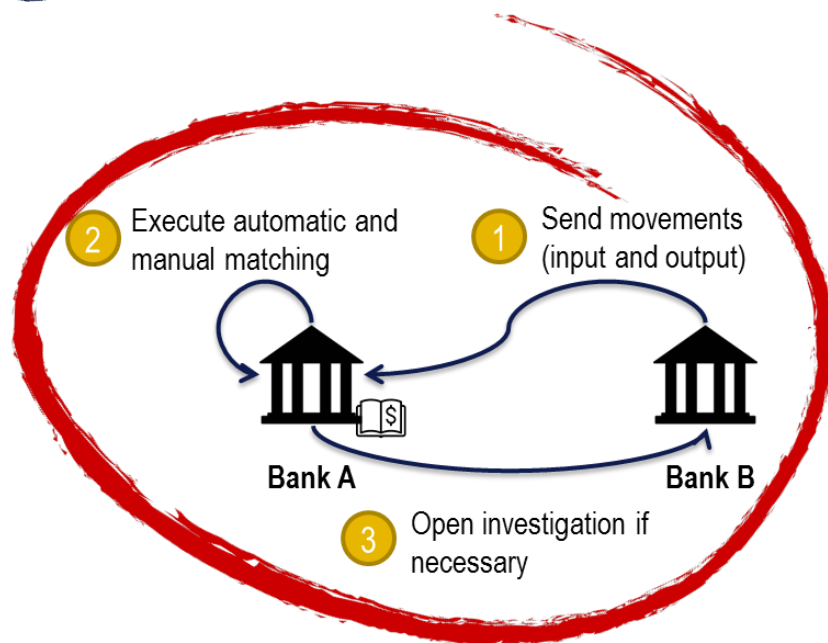
PROS



- **Niche process**: Spunta is an internal process, it doesn't involve final customers
- **New usecases**: considering this particular process, working on it we could find other possible usecases
- The Italian Banking Association have issued the **self-regulatory agreement** that rules the Spunta process
- **Thanks to the simplicity** of the Spunta process, we have sped up the activities and now we are working for production



Spunta Banca DLT – The process



- Spunta is about the reconciliation of bilateral account (a sort of nostro and vostro account). It is a process, generally run by back offices, which aim to clear every mismatch in a double-entry book-keeping, governed by an Interbank Agreement, whose first formulation dates back to 1978. **On May 15th 2019**, the executive committee of ABI approved the new Interbank agreement that rules the Spunta process and officially started the path to the production phase for all the Italian banking sector.
- This process aims to reconcile material and **not digitalized products** that are exchanged between the Banks (e.g. Commercial papers, Promissory note, etc.)
- Between each pair of banks there is a **bilateral bank account**, where input and output movements are written. The ownership of those accounts alternates between the banks every 2-3 years. All banks have at least 1 bilateral bank account with a counterparty Bank.
- Movements are **mostly matched automatically**; manual match is executed if there is a mismatch and an investigation can be opened.
- Automatic and manual matching, are activities performed by only one of the two Banks.

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.

**Reduced
operational risk**


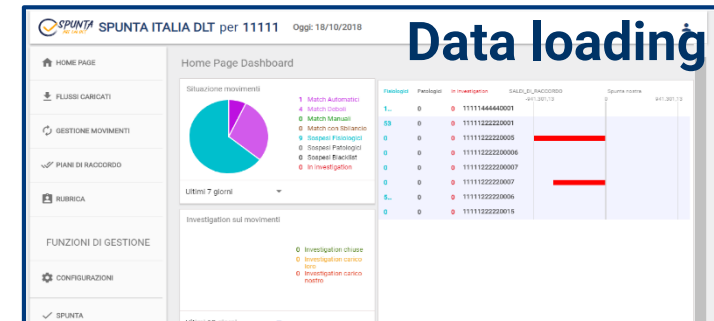
**Increased quality
checks**

Transparency

**Simplified review
activities**

Daily workflow

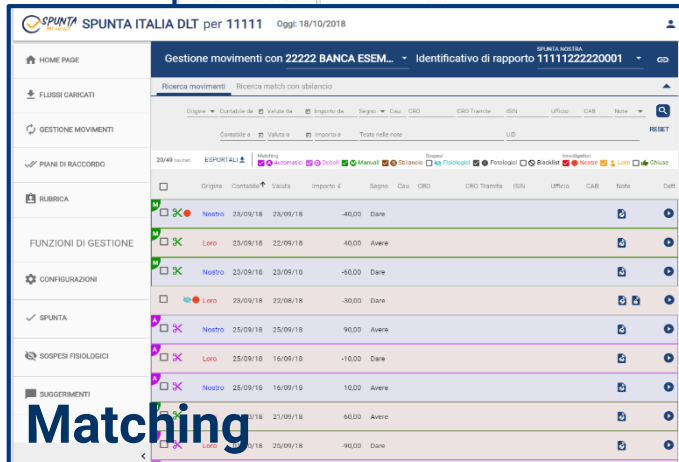
**User-friendly
interface**



Investigations

The screenshot shows the 'Dettaglio Note ed Investigations' screen. It displays a table of movements with columns: Origine, Contabile, Valuta, Importo, Segno, Causa, CRO, CRO Transite, ISIN, Ufficio, CAB, and Data. The table shows two rows: one for 'Nostro' (debit) and one for 'Loro' (credit) on 23/09/18.

Origine	Contabile	Valuta	Importo	Segno	Causa	CRO	CRO Transite	ISIN	Ufficio	CAB	Data
Nostro	23/09/18	23/09/18	-40,00	Dare							
Loro	23/09/18	22/09/18	40,00	Avere							



Matching

The screenshot shows the 'Gestione movimenti' screen for SPUNTA ITALIA DLT. It displays a table of movements with columns: Origine, Contabile, Valuta, Importo, Segno, Causa, CRO, CRO Transite, ISIN, Ufficio, CAB, Nota, and Data. The table shows several rows of movements, each with a checkbox in the 'Nota' column for investigation.

Origine	Contabile	Valuta	Importo	Segno	Causa	CRO	CRO Transite	ISIN	Ufficio	CAB	Nota	Data
Nostro	23/09/18	23/09/18	-40,00	Dare							<input type="checkbox"/>	
Loro	23/09/18	22/09/18	40,00	Avere							<input type="checkbox"/>	
Nostro	23/09/18	23/09/18	-60,00	Dare							<input type="checkbox"/>	
Loro	23/09/18	22/09/18	-80,00	Dare							<input type="checkbox"/>	
Nostro	25/09/18	25/09/18	90,00	Avere							<input type="checkbox"/>	
Loro	25/09/18	16/09/18	-10,00	Dare							<input type="checkbox"/>	
Nostro	25/09/18	16/09/18	10,00	Avere							<input type="checkbox"/>	
Loro	25/09/18	21/09/18	90,00	Avere							<input type="checkbox"/>	
Loro	25/09/18	25/09/18	-90,00	Dare							<input type="checkbox"/>	



BREADTH AND PERVASIVENESS OF THE INFRASTRUCTURE

100 existing nodes

NUMBER OF USERS

600+ users daily involved on the DLT platform

SCALE OF THE DLT ECOSYSTEM

1500+ people involved

SPEED AND ABILITY TO MANAGE VOLUMES

450+ million transactions

4+ Terabyte data on the ledger

127+ million movements between banks

NUMBER OF INTERRELATIONS

628 relazioni Peer to Peer

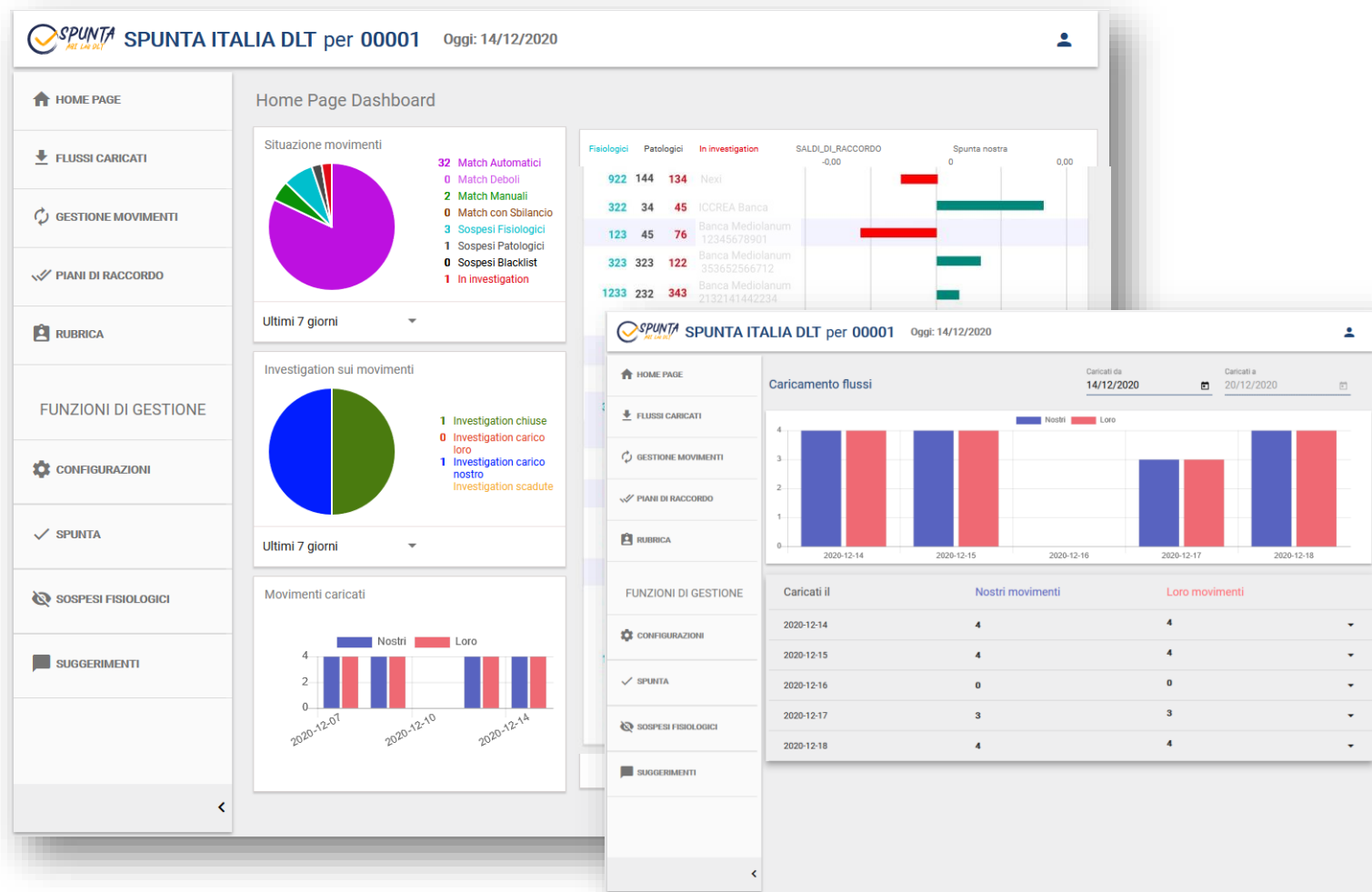
DISTRIBUTED NETWORK OF NODES

9 different points of access in Italy



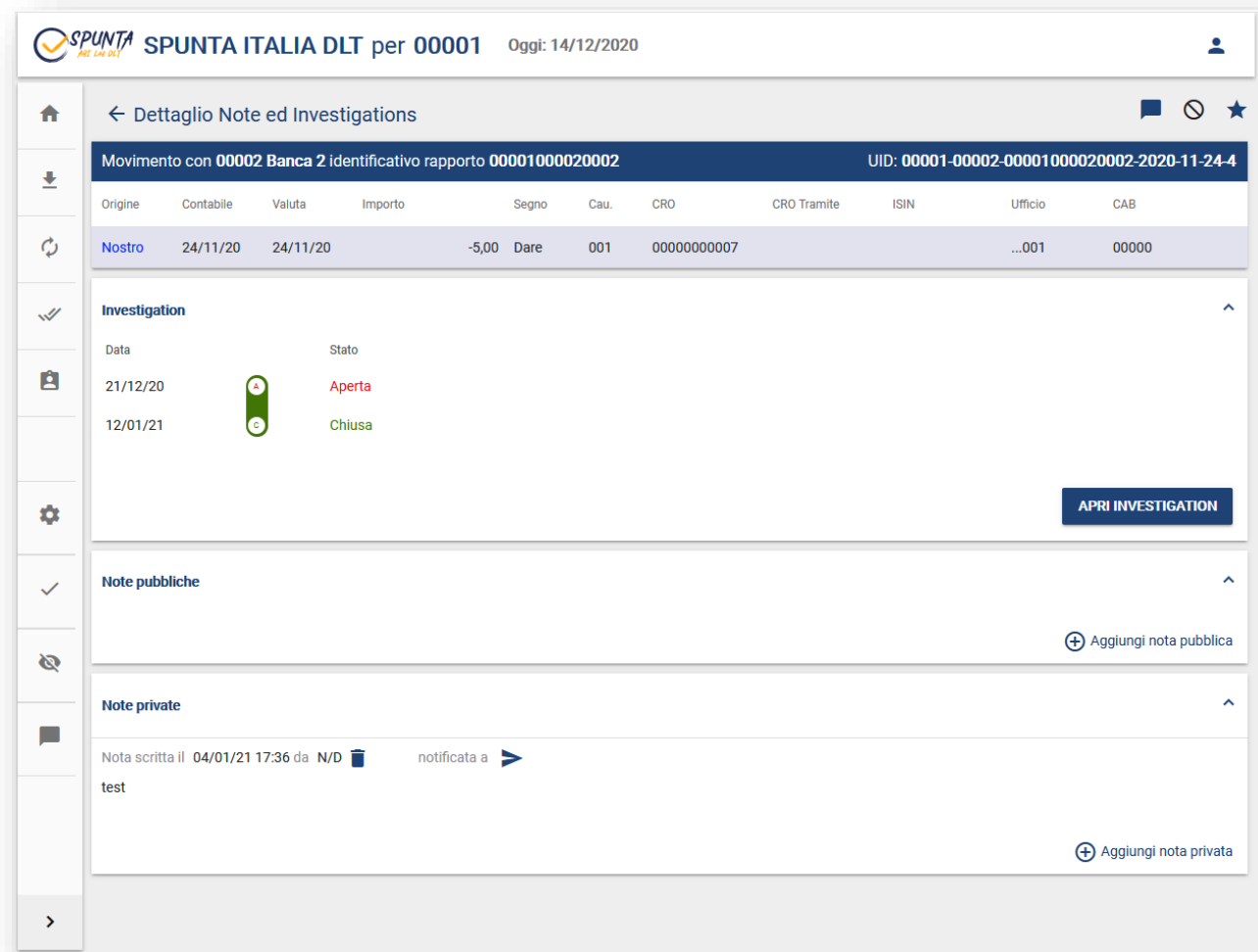
Spunta in a nutshell: data loading

- When the user connects to the application has full visibility of what happened during the data loading process:
 - How many records were processed,
 - How many records were automatically matched,
 - The current situation over the managed accounts.
- Data are exchanged via JSON files containing the movements to be loaded via an ad hoc procedure; the **loaded data** is written on the **ledger** shared between the counterparties
- The info relating to the loaded data (quantity of transactions and accounting dates loaded) are accessible via a dedicated page of “Loaded Records”



Spunta in a nutshell: investigations

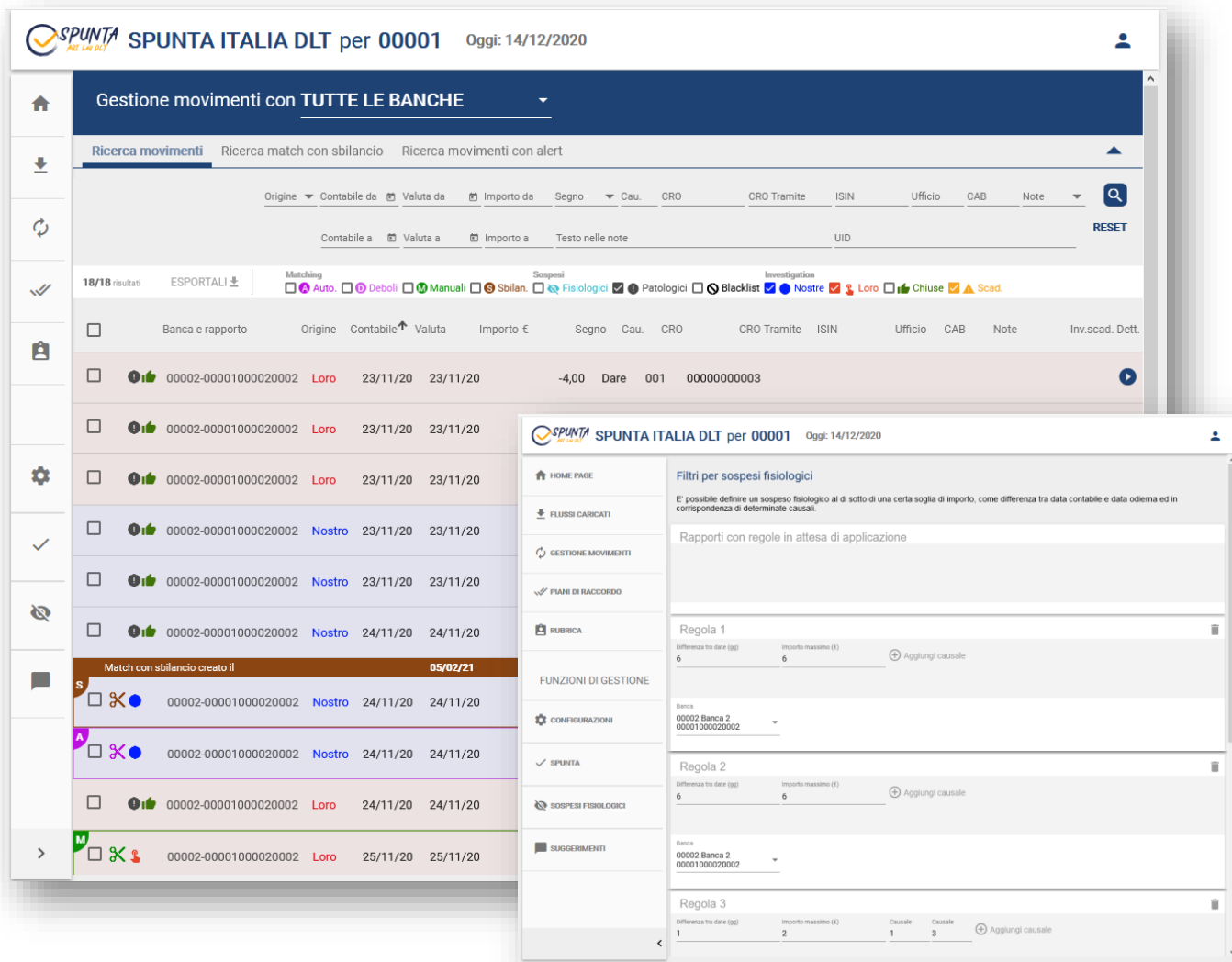
- From the Transactions Management screen, the user can have access to further detail for each uploaded movement: by just clicking on each of the records of interest, the «Detail» screen of the transaction is reached
- From this detail section, the user has the faculty of **opening an investigation to the counterparty** and / or enter notes (both public and private) for the movement itself
- The opening of an investigation is the responsibility of the account owner, and allows the simultaneous insertion of both a public note and attachments of different types of files
- When an investigation is opened, an automatic notification email is sent to the counterparty, and the operator can pass ownership of the investigation management to the counterparty
- The life cycle of an investigation ends when the owner of the relationship believes that the closing conditions are in place



The screenshot displays the SPUNTA ITALIA DLT interface for account 00001. The top bar shows the date 14/12/2020. The main section is titled «Dettaglio Note ed Investigations». It features a table of movements with columns: Origine, Contabile, Valuta, Importo, Segno, Cau., CRO, CRO Tramite, ISIN, Ufficio, and CAB. A specific movement is highlighted with the date 24/11/20 and an amount of -5,00. Below the table, the «Investigation» section shows a timeline with dates 21/12/20 (Stato: Aperta) and 12/01/21 (Stato: Chiusa). There are buttons for «APRI INVESTIGATION», «Note pubbliche», and «Note private». The «Note private» section shows a note written on 04/01/21 at 17:36, with a notification icon and a button to «Aggiungi nota privata».

All the information exchanged via notes and investigations is run via **DLT communication** and recorded on the ledger

Spunta in a nutshell: matching and transactions management



The screenshot displays the SPUNTA ITALIA DLT per 00001 interface. The top navigation bar includes the SPUNTA logo, the text "SPUNTA ITALIA DLT per 00001", and the date "Oggi: 14/12/2020". The main section is titled "Gestione movimenti con TUTTE LE BANCHE". Below this, there are tabs for "Ricerca movimenti", "Ricerca match con sbilancio", and "Ricerca movimenti con alert". A search bar with various filters (Origine, Contabile da, Valuta da, Importo da, Segno, Cau., CRO, CRO Tramite, ISIN, Ufficio, CAB, Note) and a "RESET" button is present. A table of transactions is shown, with columns for Banca e rapporto, Origine, Contabile, Valuta, Importo €, Segno, Cau., CRO, CRO Tramite, ISIN, Ufficio, CAB, Note, and Inv.scad. Dett. The table lists several transactions, some with status icons (green checkmark, red X, etc.). A sidebar on the left contains navigation icons. A modal window titled "SPUNTA ITALIA DLT per 00001" is open, showing "Filtri per sospesi fisiologici" and "Rapporti con regole in attesa di applicazione". It includes sections for "Regola 1", "Regola 2", and "Regola 3" with input fields for "Differenza tra date (gg)", "Importo massimo (€)", and "Causale".

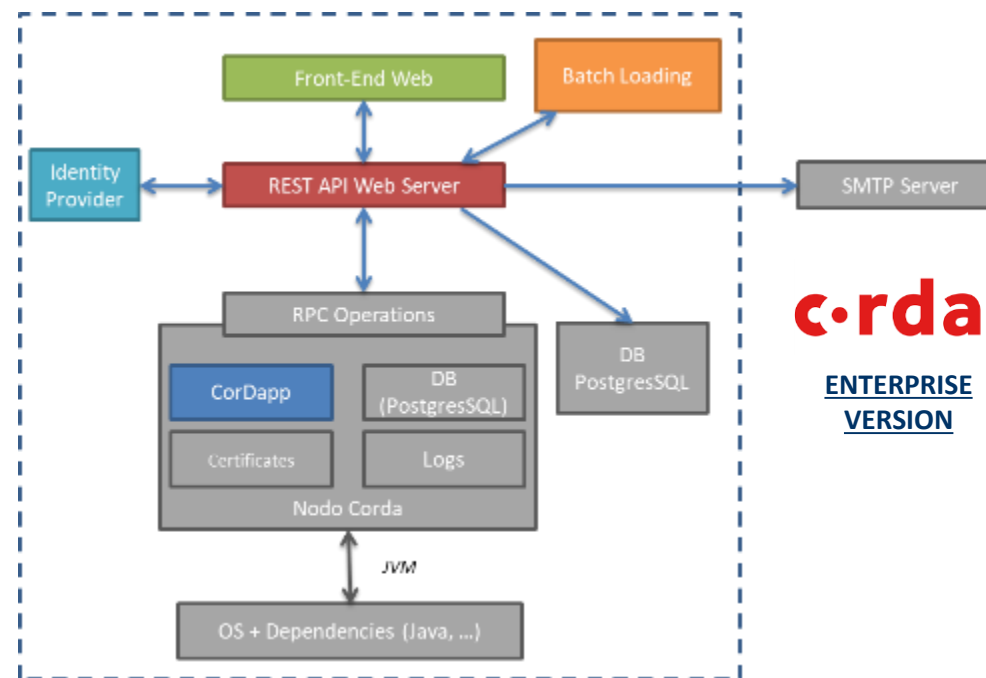
- The user can then go to the «Gestione Movimenti» page (being: Transactions Management section) where he can have access to the data loaded on the ledger
- On the screen, the user can see all transactions and can filter by:
 - Matched records
 - Records to be manually matched
 - Dates, sources, sign, amount...
- The **matching procedure** is a complex **algorithm** running after the data loading process, enabling the coupling of transactions having specific conditions met
- This is the operational screen where the users perform the reconciliation process

The architecture and what we have built

Which are the components that constitute the **new application for the Spunta?**
It's good to point out that CorDapp it's just **one of several building blocks**.

The following architectural components have been developed in the PoC:

1. Front-End Web
2. API RESTful
3. CordaApp
 - Flows
 - States
 - Contracts
4. Identity Provider
5. Batch Loading



Some figures...

+20 Flows
+20 States

+50 APIs Services

+30 Web Pages

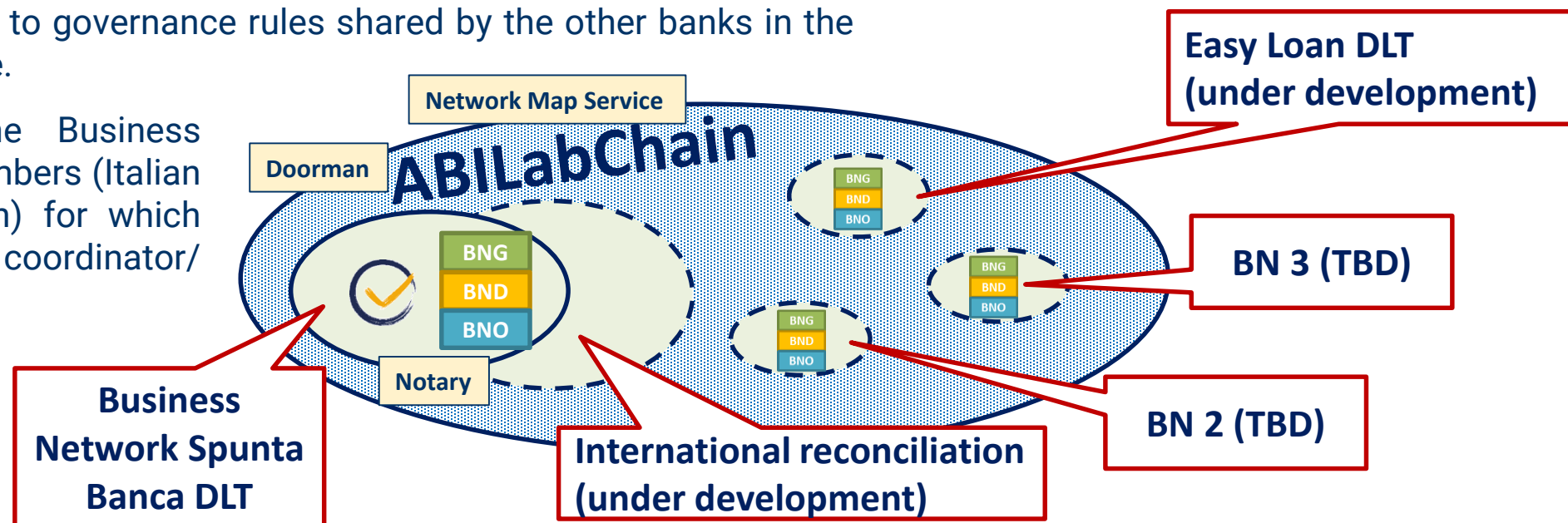


Spunta infrastructure development implied the creation of a functional space able to host other use cases, each of which may have different actors in its own governance.

The final idea is to create an international network that connects the banks with Corda, enabling them to perform as first use case the international reconciliation, but then many other projects and use cases.

- ❖ **Business Zone** – Banks belonging to one or more Business Networks, enabled by a common blockchain / DLT technological infrastructure and organized according to governance rules shared by the other banks in the same Business Zone.

- ❖ **ABILabChain** - The Business Zone of the ABI members (Italian Banking Association) for which ABI Lab acts as coordinator/facilitator.



For the future, we are thinking of additional possible use cases to re-use the platform and to create an international network.



The Governance Model

6 Level 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 Banca DLT is a "banks full sector" BN project.)



Business Network Governor (BNG)



The subject in charge of creating, coordinating e managing a BN. Responsible of consensus between BN participants. **BNG** identifies and selects **BNO** and **BND**.

ABI Lab

Business Network Designer (BND)



The subject identified by **BNG** in charge of designing and developing one ore more applications based on PP-DLT shared between BN participants. **BND** collaborate with **BNO** managing the availability of these multiple applications scenario within **BN** participants.

NTT DATA

Business Network Operator (BNO)



The subject identified by **BNG** in charge of one or more application services. **BNO**, interacting and or supported by **DNP** and **BND**, handles event management, incident management, request fulfillment, problem management and service desk.

SIA

DLT Network Provider (DNP)



The subject identified by **BNO** whose DLT infrastructure is shared between BN participants. Basically guarantees all the needed operations support, customer assistance, SLA monitoring, etc.
Specifically for **ABILabChain**, the **DNP** has also in charge full identification of each node (it's a private permissioned DLT) the Cordapp node's deployment and helps propagating ABI rules and procedures.

SIA

Platform



The real "operating system" enabling the use case, typically a **PP-DLT**.

r3.
c-rda

Key Success Factors & Attention points

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



Attention points

Governance definition

Integration with internal systems of each bank

Migration plan

Avoid any lock-in

Use case costs: Running
+ Infrastructure

The technological challenges faced for a DLT production environment

Privacy



Compliance management in the GDPR framework with a DLT, granted also with a DPA with all banks

Distributed architecture, with bank-owned nodes.
Testing in a production-like scenario and in more than one environment with multiple nodes.

Architecture & Testing



Archiving



Development of a solution that allows to historicize the information recorded on the DLT and archive the ledger

Direct participation in the developments, also within sight of the new major releases, of the reference platform

DLT Platform



Performance



Performance optimization with million transactions on the ledger

Continuous improvement through the development of new features set out by the users

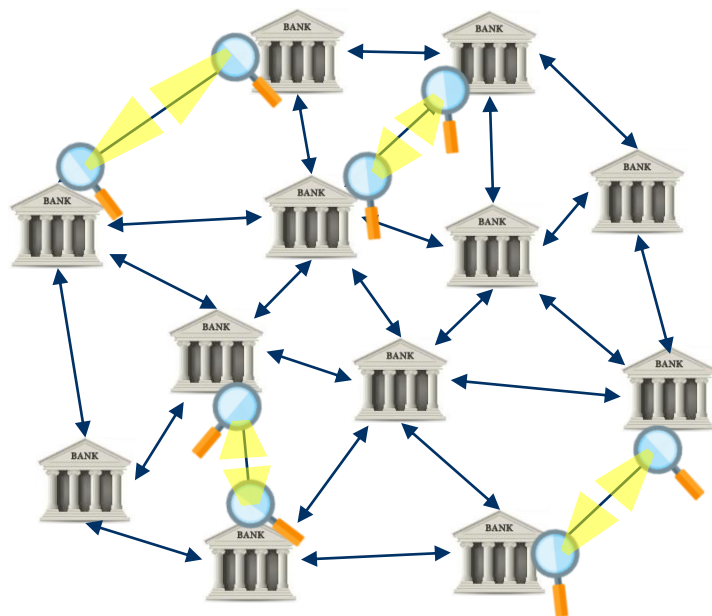
Continuous Improvement



Why Corda?

As part of the first phase of the project, a survey was conducted on the available blockchain platforms, and the working group selected the Corda platform.

c·rda



Main characteristics:

- **Permissioned**
- **Information shared following the principle of "Need to know"**
- **Native bilateral channels**



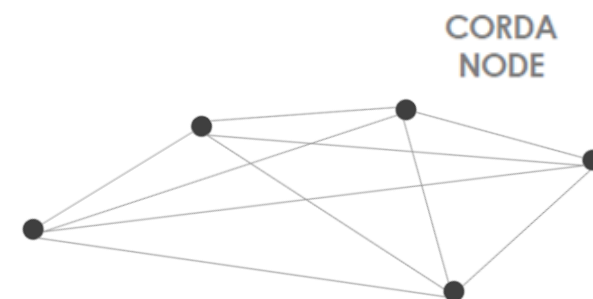
The reference version of Corda used for the development of the CorDapp is the 3.3. We currently use the CE 4.4.10 version.

In a Corda based Business Network there are several actors with different roles, in particular:

- **Nodes**
- **Notary**
- **Network Map Service**
- **Permission Service/Doorman**

Since they are not necessary or within the perimeter of the POC some services weren't used such as:

- **Oracles**
- **Observers**



A working (and replicable) operational model



Contracts that cover the use of the infrastructure, the Spunta service and the licensing

Ordinary and extraordinary maintenance, continuous improvement approach

Common rules of procedures for a standardized process

Moving towards cross country interbank reconciliation

Spunta Banca DLT has effectively **brought blockchain to the Italian banking sector** through an infrastructure that will be able to host other applications in the future.

Spunta could be the forerunner for a series of further projects in the banking and financial sector **in Italy and worldwide.**



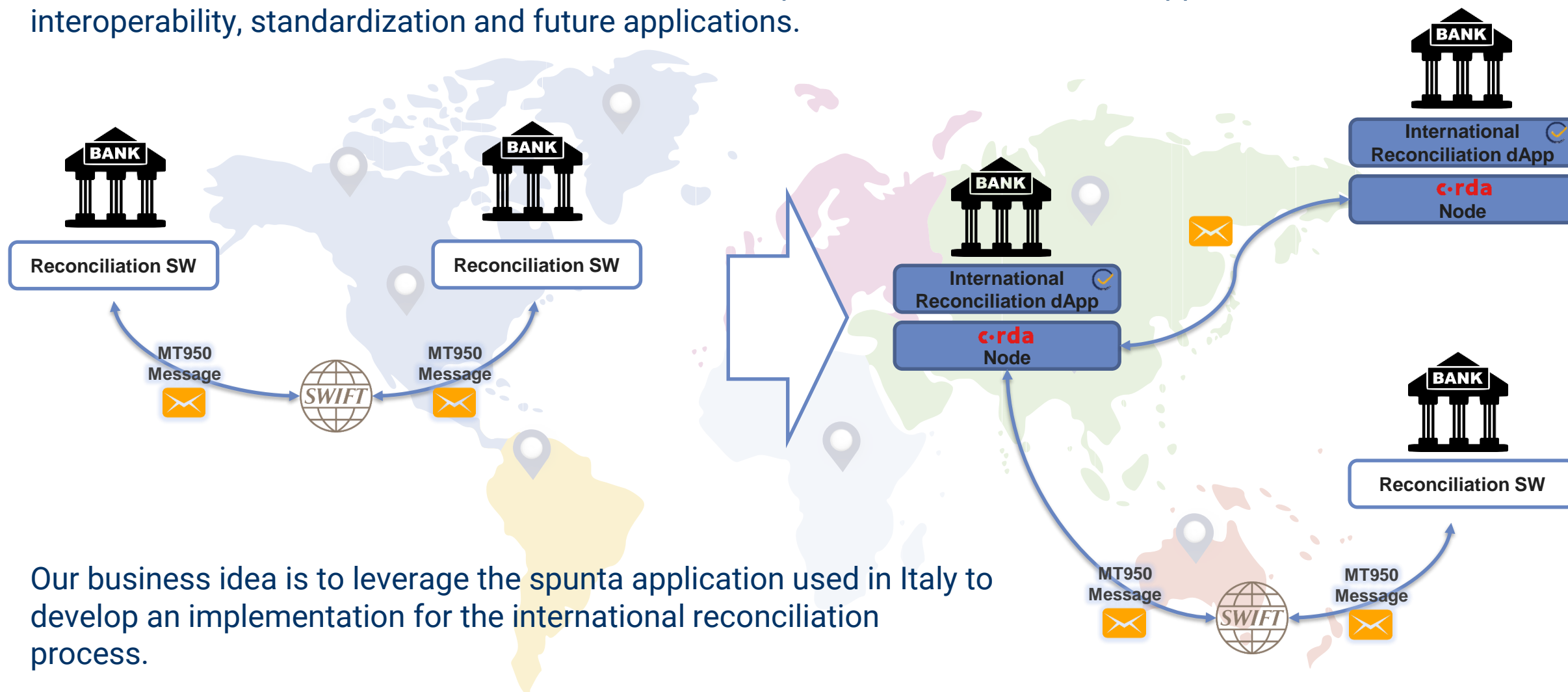
DLT has no borders and we are working to bring our project at **international level.**

It would be necessary to adapt the application, because the reconciliation process in Italy is based on mutual accounts, while abroad are used ordinary banking accounts.

The first step therefore would be to **build at international-level a working group** to draw the requirements **together**, replicating the virtuous model followed in Italy.

AS IS vs TO BE

Our proposal is to improve the international reconciliation from MT950 messages, segregated and fragmented softwares to create a common DLT infrastructure and platform and a distributed application that enables interoperability, standardization and future applications.



Our business idea is to leverage the spunta application used in Italy to develop an implementation for the international reconciliation process.

