ECB EXPLORATORY WORK ON WHOLESALE CBDC: LEONIDAS AND OTHER EXPERIMENTS

DLT in Wholesale CBDC: Leonidas Technological Insights and other Case Studies

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Leonidas: high level overview

GOAL: Explore the benefits of a wCeBM DLT-based, by testing the last mile of the interbank Spunta process in a distributed infrastructure

1 Leonidas is an **DLT application based on Corda 4** that interoperates with other DLTs by comunicating through agreed-upon protocols.

2 Leonidas **handles CoBM modelled as liquid balances** on mutual accounts between pairs of banks. An **atomic swap** is performed upon settlement of the liquid balances – the debtor party pays CeBM while the creditor party sets the related liquid balance to «paid»

3 Either **both** legs of the operation **are successful, or none is**.

4 A key aspect of the Leonidas project is the possibility of **interoperability between different DLTs** to ensure secure, transnational transactions. The solution was tested in a **controlled environment**, with synthetic data, to meet a range of needs without having to involve entire banking institutions during the pilot phase.

LEONIDAS

Liquidation
Effective
ONcha**I**n
Dl**t**
Asset on
Spunta

Tested use cases for Milano Hub Call for Proposals

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.
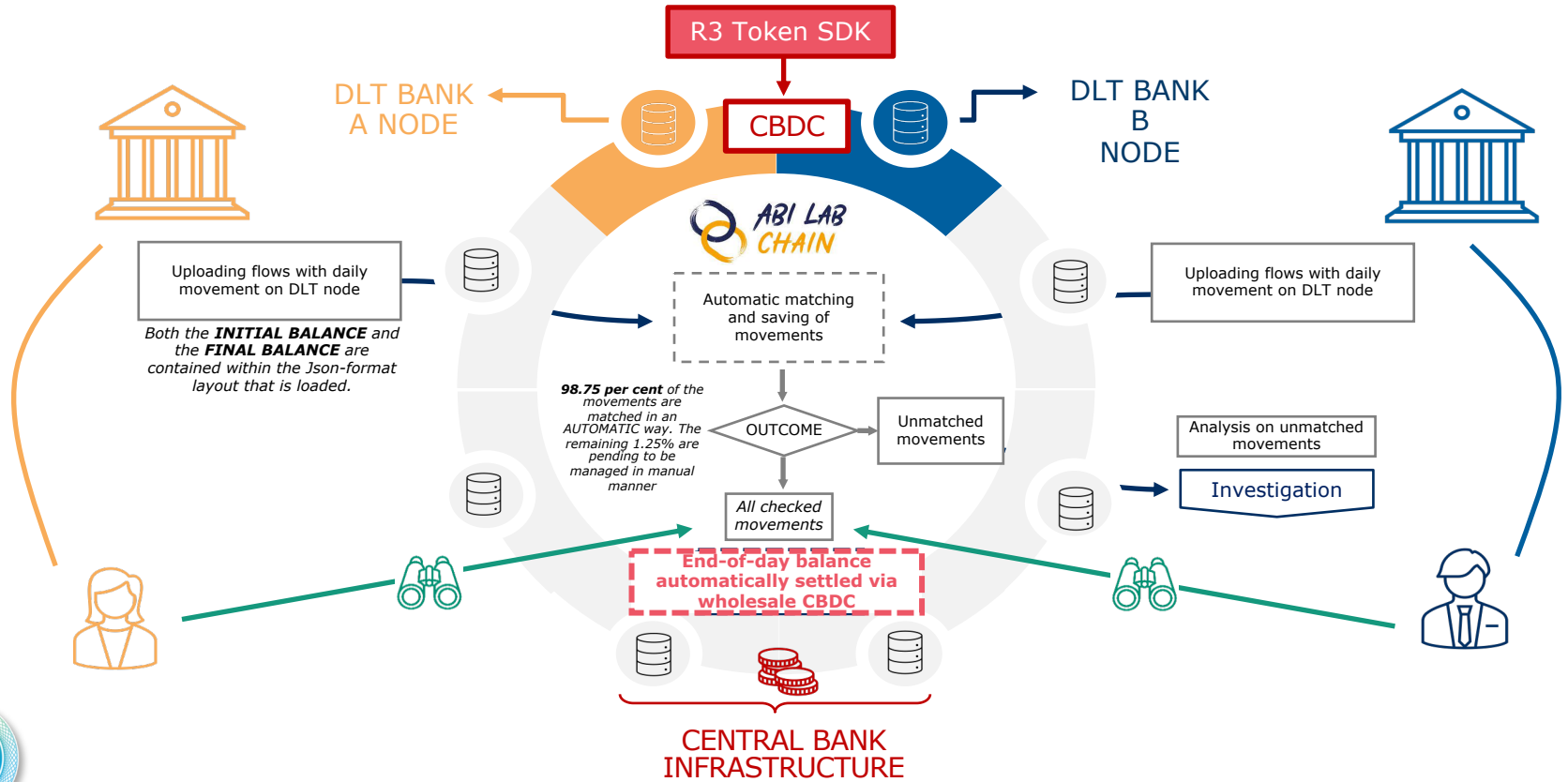
Cash in Transfer

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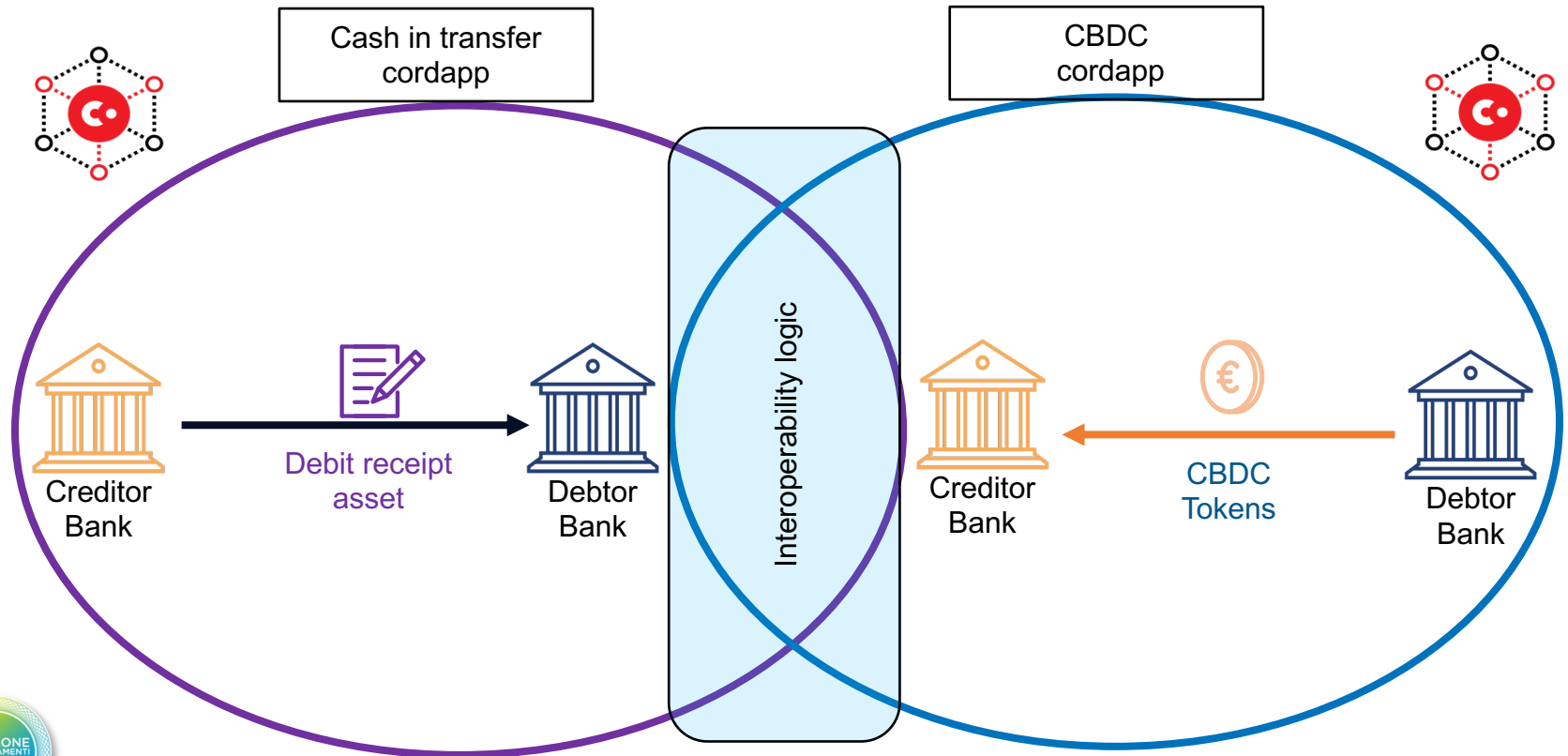
This use case makes it possible to link atomically the transfer of physical cash with related settlement of deposits/ withdrawals, providing a single reliable record of the transaction and increasing confidence in the system.

Use Case 1: Liquid Balance

R3 Token SDK

CBDC

DLT BANK A NODE

DLT BANK B NODE

ABI LAB CHAIN

Uploading flows with daily movement on DLT node

*Both the **INITIAL BALANCE** and the **FINAL BALANCE** are contained within the Json-format layout that is loaded.*

Uploading flows with daily movement on DLT node

Automatic matching and saving of movements

98.75 per cent of the movements are matched in an AUTOMATIC way. The remaining 1.25% are pending to be managed in manual manner

OUTCOME

Unmatched movements

Analysis on unmatched movements

Investigation

All checked movements

End-of-day balance automatically settled via wholesale CBDC

CENTRAL BANK INFRASTRUCTURE

Use Case 2: Cash in Transfer

Cash in transfer cordapp

CBDC cordapp

Interoperability logic

Creditor Bank

Debit receipt asset

Debtor Bank

Creditor Bank

CBDC Tokens

Debtor Bank

Leonidas & the Eurosystem Exploratory Work

CONTINUING THE EXPERIMENTAL WORK OF THE MILANO HUB
The next step was the participation in the ECB's Call for Interest, which involved eight participating banks.

GOAL OF THE USE CASE
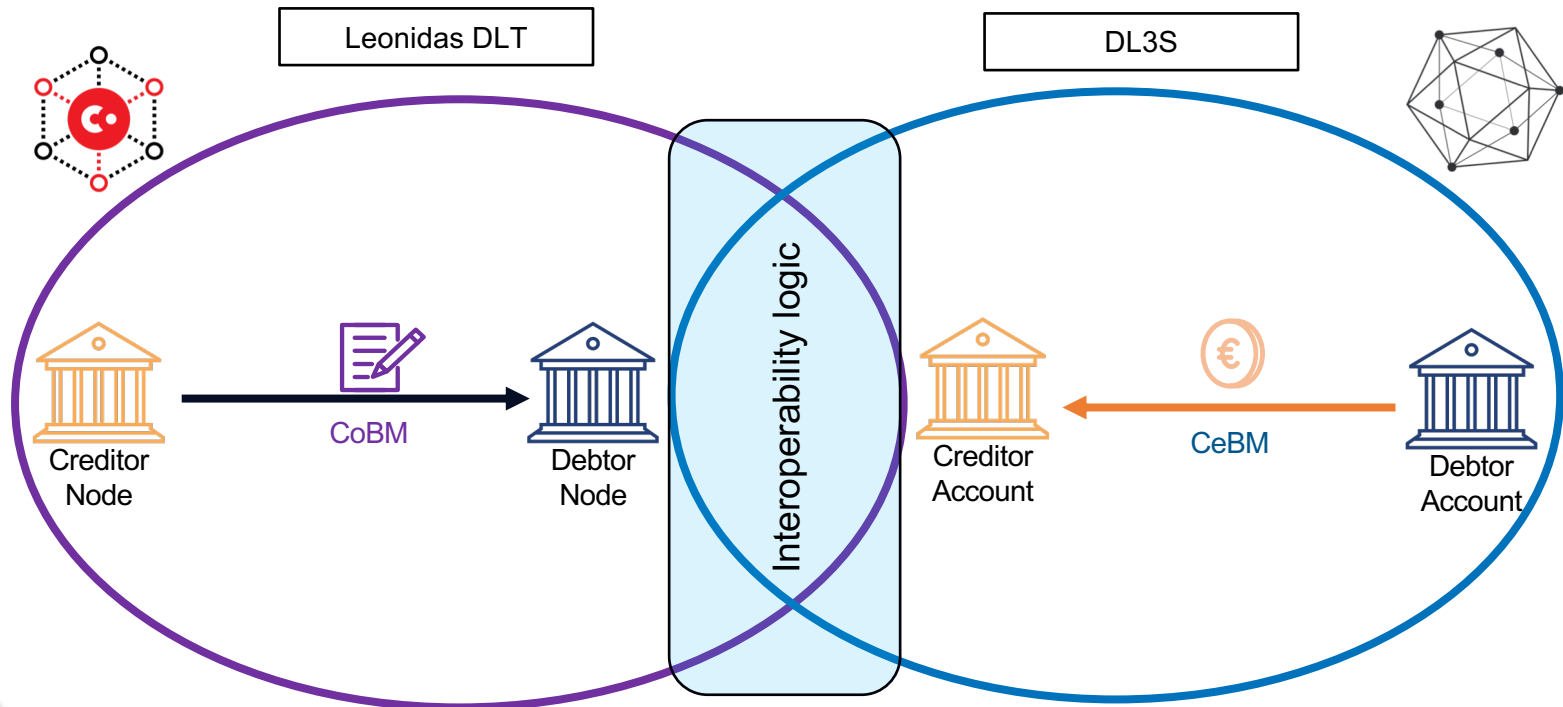Settlement of liquid balances from reconciliation process

INTEGRATION WITH BANQUE DE FRANCE SOLUTION
The experiment uses the DLT full interoperability solution developed by Banque de France, enhancing the exploration of technological capabilities for the European financial infrastructure.
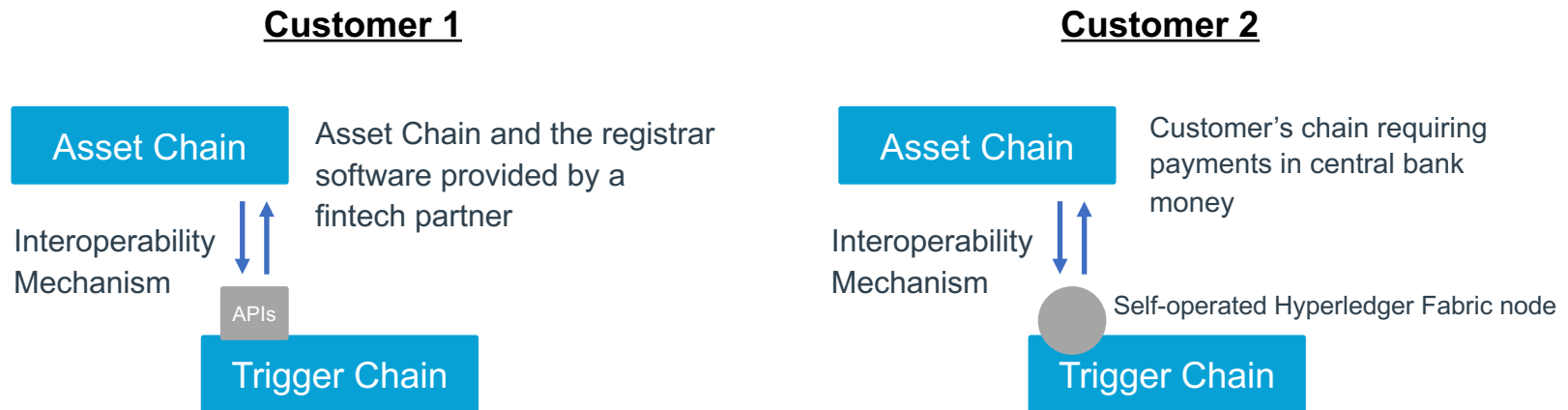
Leonidas & the Eurosystem Exploratory Work

Leonidas DLT | Interoperability logic | DL3S

CoBM — Creditor Node → Debtor Node

CeBM — Creditor Account ← Debtor Account

DLT Case Study 1: Bundesbank's Trigger solution

NTT DATA supports participation of two German banks in ECB 2024 exploratory work on new settlement technologies
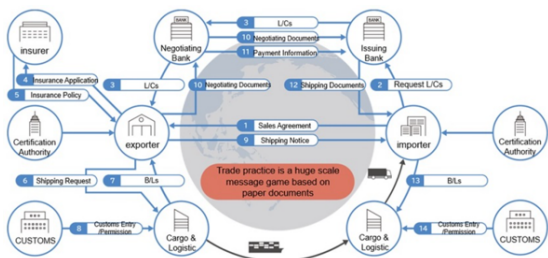
GOAL: Demonstrating how traditional banking services can be adapted to new emerging DLT world, by maintaining the well know security for customers through traditional system of liabilities

Customer 1

Asset Chain

Asset Chain and the registrar software provided by a fintech partner

Interoperability Mechanism

APIs

Trigger Chain

Customer 2

Asset Chain

Customer's chain requiring payments in central bank money

Interoperability Mechanism

Self-operated Hyperledger Fabric node

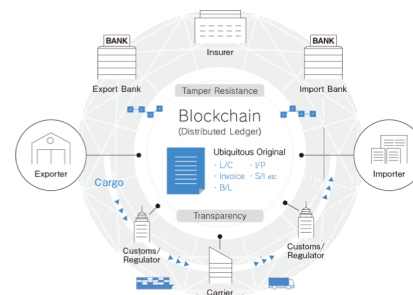Trigger Chain

DLT Case Study 2: TRADEWALTZ®

BUSINESS NEED

• International trade is a complex system with many actors, considered impossible to digitise with traditional technologies.

• Paper-documented, expensive and difficult trading operations.

• Lack of transparency and traceability in data

SOLUTION

In 2017, NTT formed a cross-industry consortium to explore digital technologies for secure and efficient trade operations. This led to the development of the TradeWaltz® platform, which uses DLT and smart contracts for atomic swap transactions. Launched in 2020, it revolutionized trade digitalization.
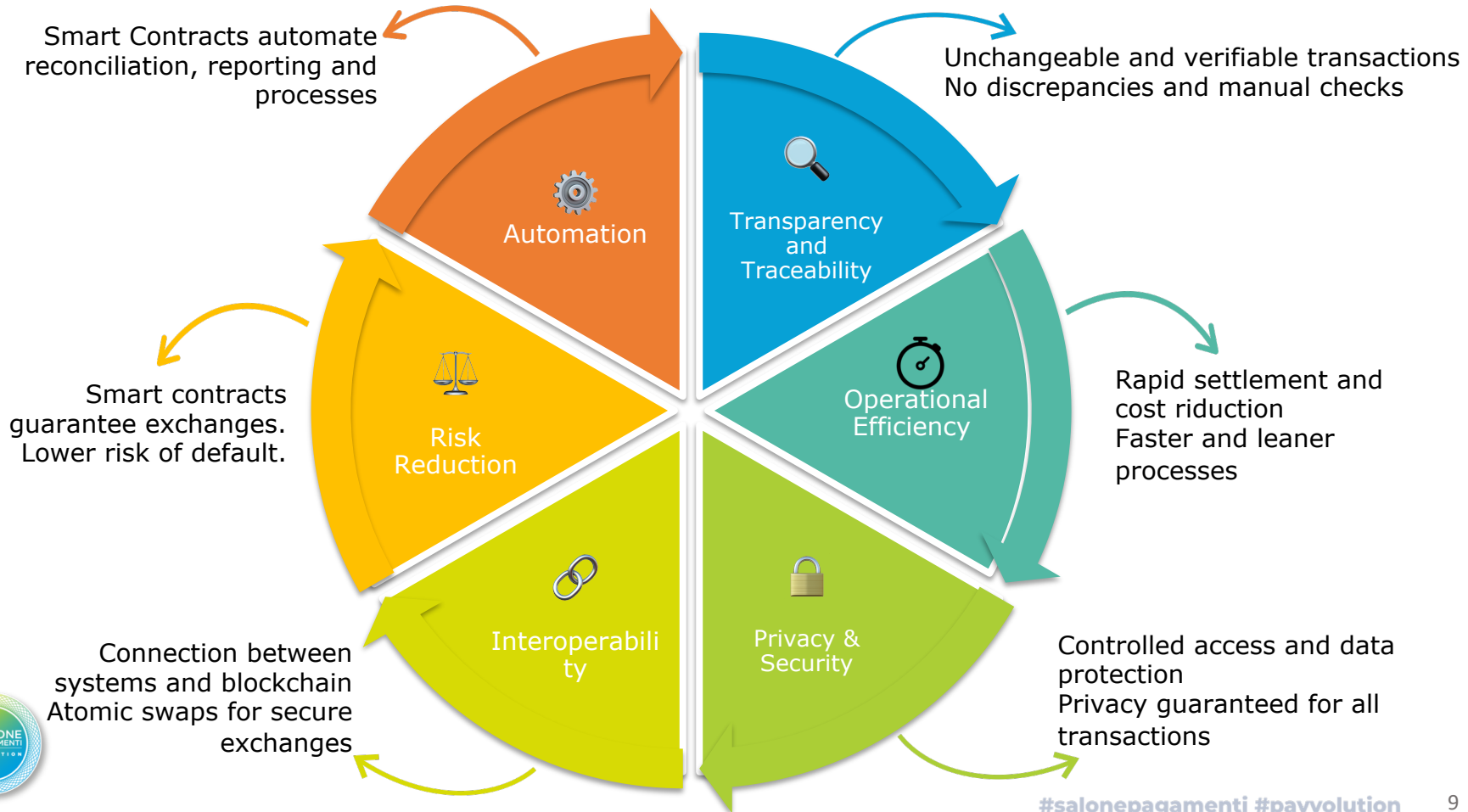

BENEFITS

• Reduce up to 44% operating costs compared to existing trading operations
• Guaranteed authenticity of digital documents and transfers of rights
• No need to double check and store boxes of documents
• Real time data sharing and status updates with a business process management system

" It is the first time in the world that 5 countries - Japan, Thailand, Singapore, Australia, and New Zealand - have all at once linked cross-industry B2B platforms that are based on blockchain technology.

DLT benefits

Smart Contracts automate reconciliation, reporting and processes

Unchangeable and verifiable transactions
No discrepancies and manual checks

Automation

Transparency and Traceability

Operational Efficiency

Rapid settlement and cost riduction
Faster and leaner processes

Smart contracts guarantee exchanges. Lower risk of default.

Risk Reduction

Interoperability

Privacy & Security

Controlled access and data protection
Privacy guaranteed for all transactions

Connection between systems and blockchain
Atomic swaps for secure exchanges

Conclusion

1   **Leonidas** demonstrated how **DLT can improve interbank settlement** with **efficiency** and **security**.

2   Projects such as **TradeWaltz®** and the **Trigger Solution** show the impact of DLT in making trade and payments **smoother and more secure.**

3   **DLT** will become increasingly **crucial** in making payments **faster, more transparent and more secure**, supporting an **interoperable** and global financial infrastructure.

Thanks.

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