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Introduction to Half Epsilon

Outline

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- About Us
- Problem Statement
- Our Product
- Use Case 1: Inter-bank Payments
- Use Case 2: Inter-bank Risk Participation
- Use Case 3: Inter-bank Repo

About Us

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Pralhad Deshpande, Ph.D.

Responsible for vision, design and overall execution

Sanil Borkar

Responsible for engineering the core technology

Stony Brook University

Bell Laboratories

Microsoft Research

IBM Research

UF UNIVERSITY of FLORIDA

aws

businessolver

About the Company

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Half Epsilon Pte. Ltd.

- Incorporated in Singapore, Feb 2020.

March 2020 – Now

- Solved a very difficult and impactful technical challenge.
- Built the technology. Patent pending.
- Identified several use cases.
- Looking for an anchor partner.

Problem

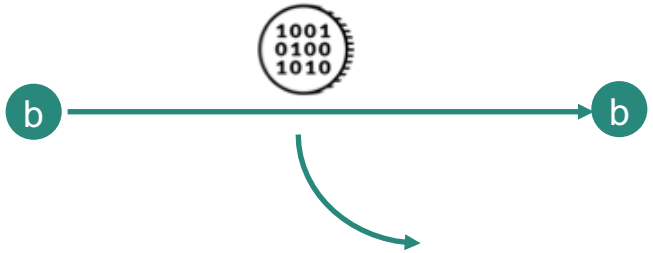
Institutional tokens are different from Crypto-currencies

Crypto-currencies have two requirements

- Secure Double-spend Prevention
- Decentralization – No centralized control over transaction processing

Institutional tokens have two additional requirements

- Confidentiality – Parties not involved in the transaction should not be aware of it
- Compliance – Adherence to data residency, data hygiene and financial reporting guidelines



How to transfer tokens?

Current Attempts are Blockchain Inspired

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Let's look at four examples.

Ethereum

Public Blockchain with Smart Contract functionality.

ConsenSys Quorum

Permissioned version of Ethereum.

IBM Hyperledger Fabric

IBM's permissioned Blockchain.

R3 Corda

Distributed Ledger Technology (DLT).

None of these designs jointly satisfy the four requirements.

Half Epsilon's Approach

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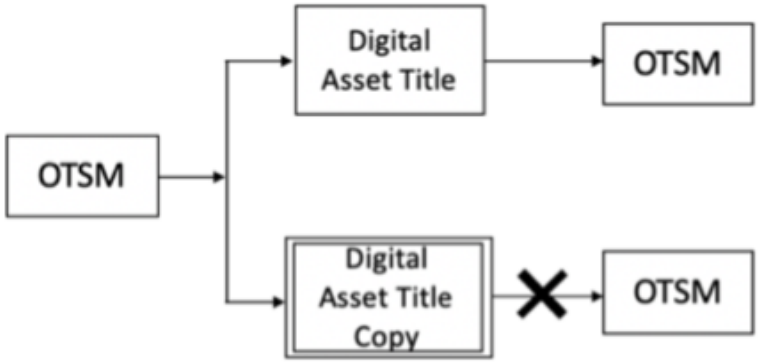
1. Ignore the Blockchain / DLT hype
2. Re-solve the double-spend prevention problem to satisfy the four requirements

This is very hard. But, we did it!

Product: One Time Spend Machine

OTSM – A Special Purpose
FIPS 140-2 Level 3 HSM



OTSM prevents a digital asset from being spent multiple times.

	OTSM
Confidentiality	Yes
Secure DSP	Yes
Decentralization	Yes
Compliance	Yes

OTSM enables direct institution-to-institution transfers of tokens.

Features

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- Secure Minting
- Secure Storage
- Confidential Transfers
- Unbounded Scalability
- High Resilience
- Audit role for Regulators

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Use Case 1: Inter-bank Payments

From Hub and Spoke to Point-to-point

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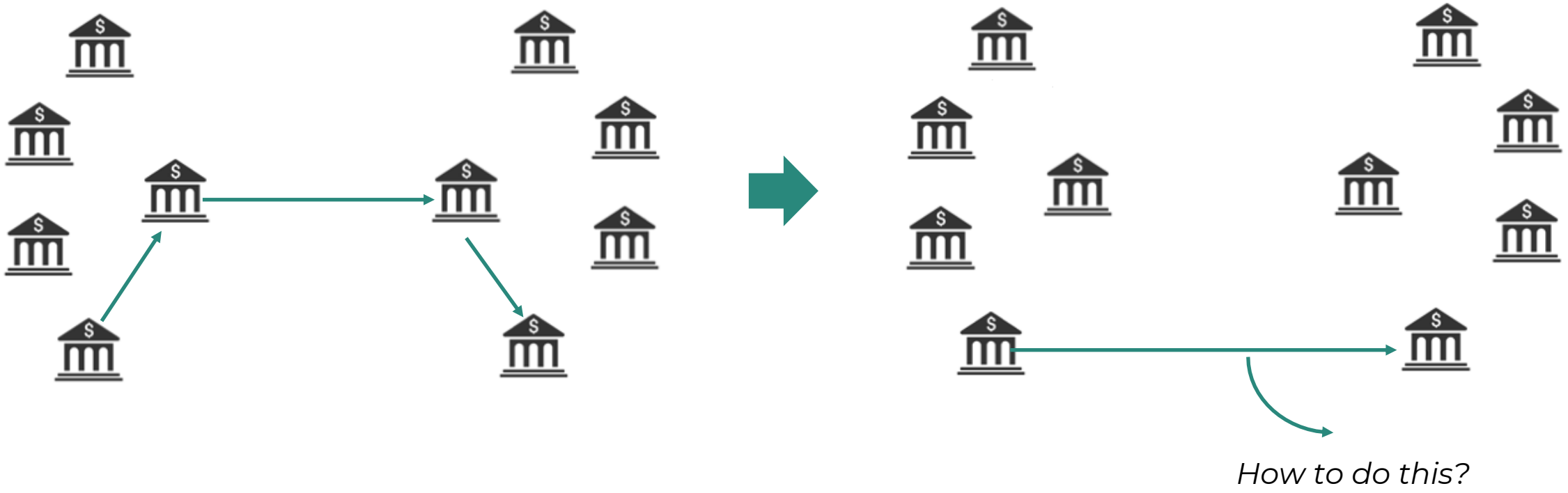
Partior use case



Key Enablers

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Tokenized Fiat Currencies

- Inspired by Crypto-currencies
- Digital Bearer Assets, to be transferred point-to-point between institutions
- Denominated in fiat currencies like SGD, USD, etc.
- Issued by a bank

One Time Spend Machine

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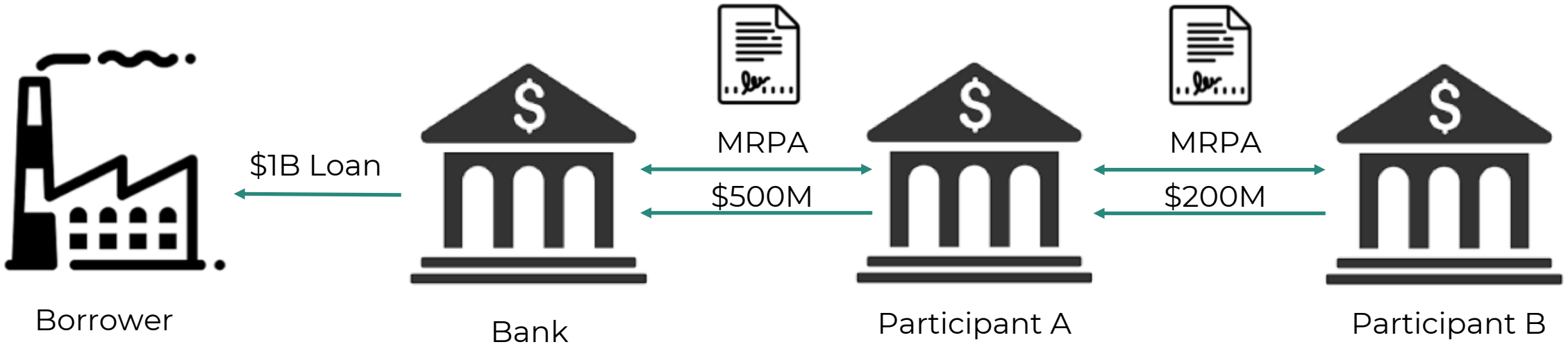
Use Case 2: Inter-bank Risk Participation

Risk Participation Chain

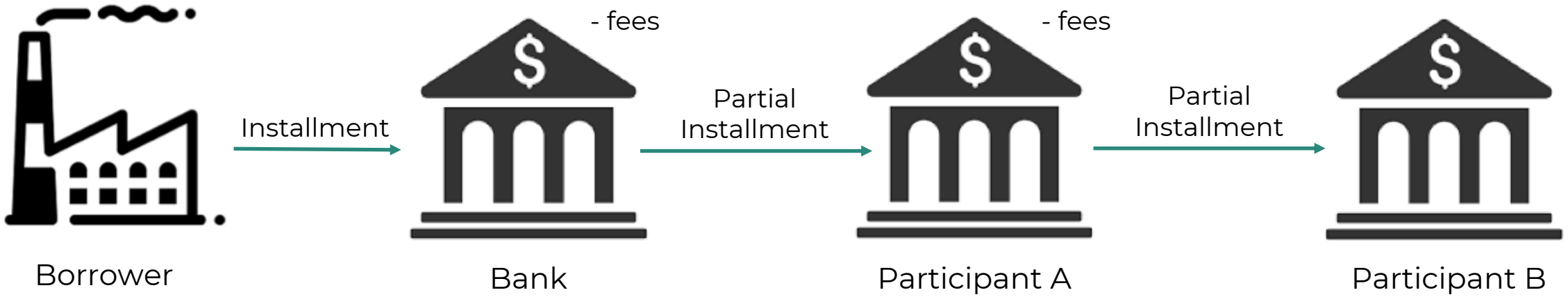
A participant could sell its exposure to another participant



Chaining adds additional risk, reduces return

Risk Participation Chain

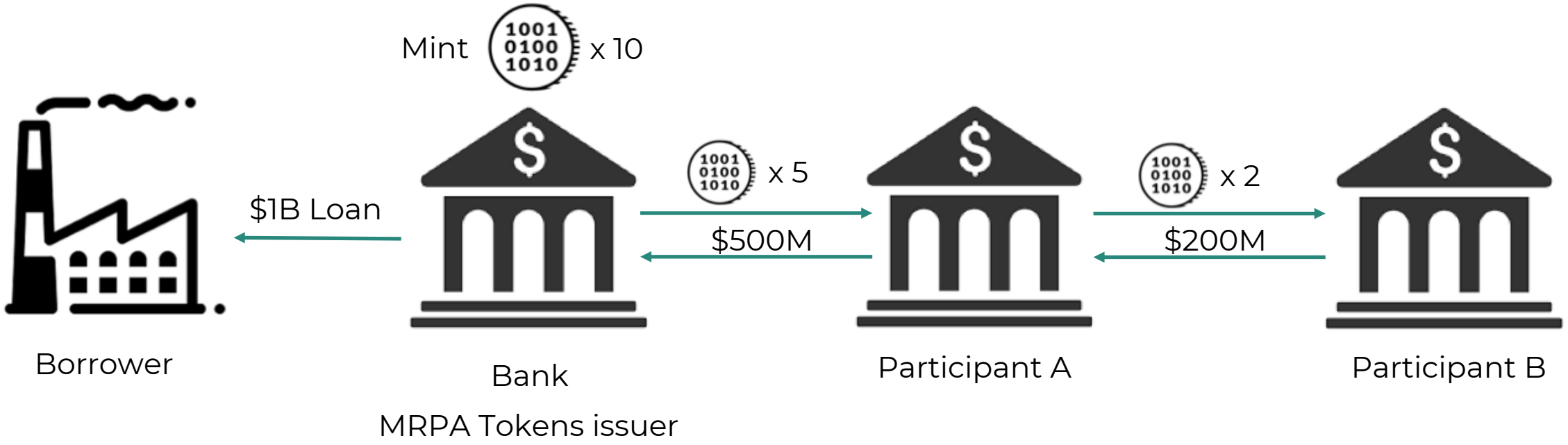
Partial installments are transferred down the chain.



Chaining adds additional risk, reduces return

Risk Participation with MRPA Tokens

MRPA Tokens are Digital Bearer Assets



Digital Bearer Assets can be transferred from bank to bank instantly and with settlement finality.

Risk Participation with MRPA Tokens

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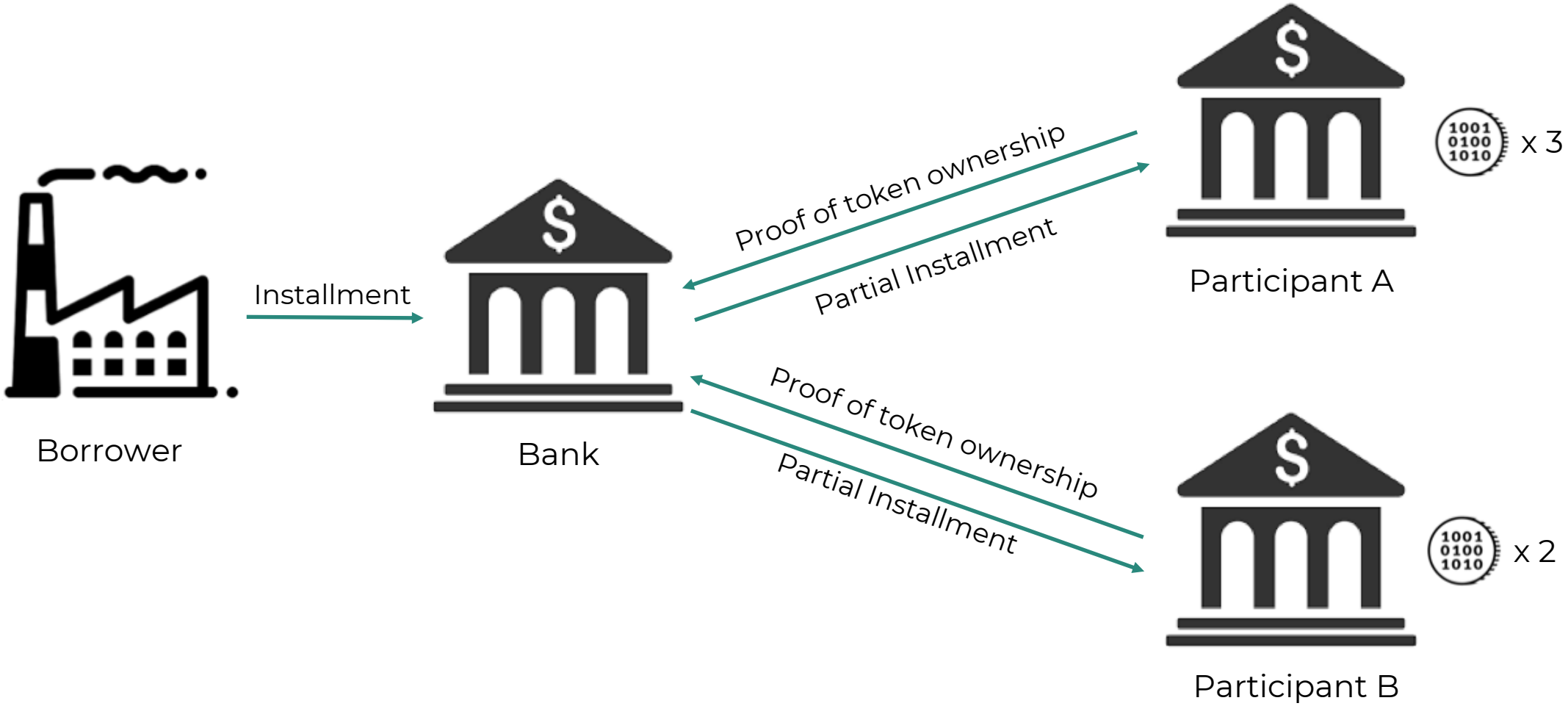
On installment due date, participants present proof of MRPA Token ownership. Issuer makes partial payments.



MRPA tokens reduce intermediaries and consequently risk. Participants get better returns.

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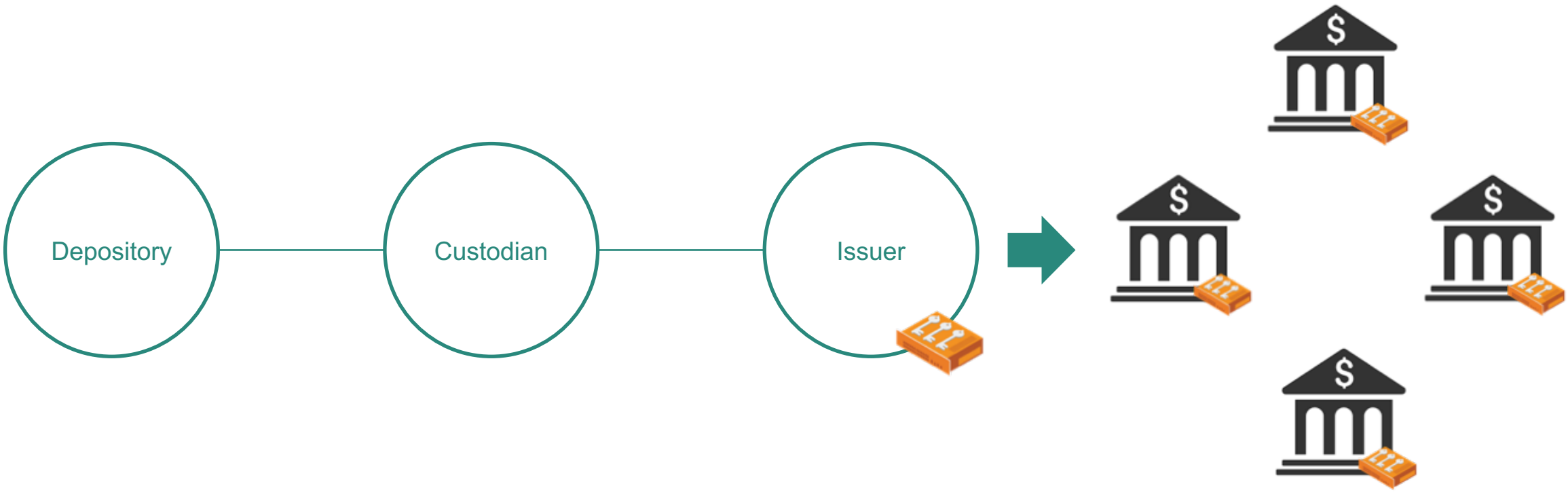
Use Case 3: Inter-bank Repo

Token Issuance



Token transfers are instant.

Bank in the OTC Network holds beneficiary interest in underlying securities represented by token.

Servicing Tokens

What a token represents can change over time

Token ID	Issuance Date	Issuer	Securities	Securities Custodian	Accrued Cash
DBS-101	1/1/2022	DBS	1000 shares of APPL	JP Morgan	USD 220
DBS-102	30/3/2022	DBS	1000 shares of MRK + 1000 shares of OGN	JP Morgan	0

A token may represent a new set of securities, perhaps after a corporate spinoff.

A token may accrue cash, perhaps after dividends are distributed.

Issuer manages corporate actions

Repurchase Agreements (Repo)

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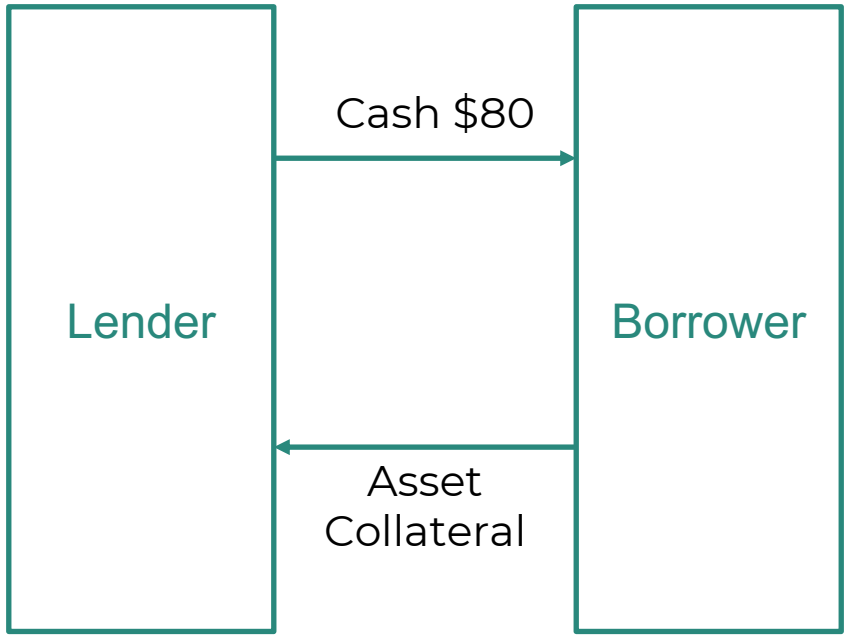
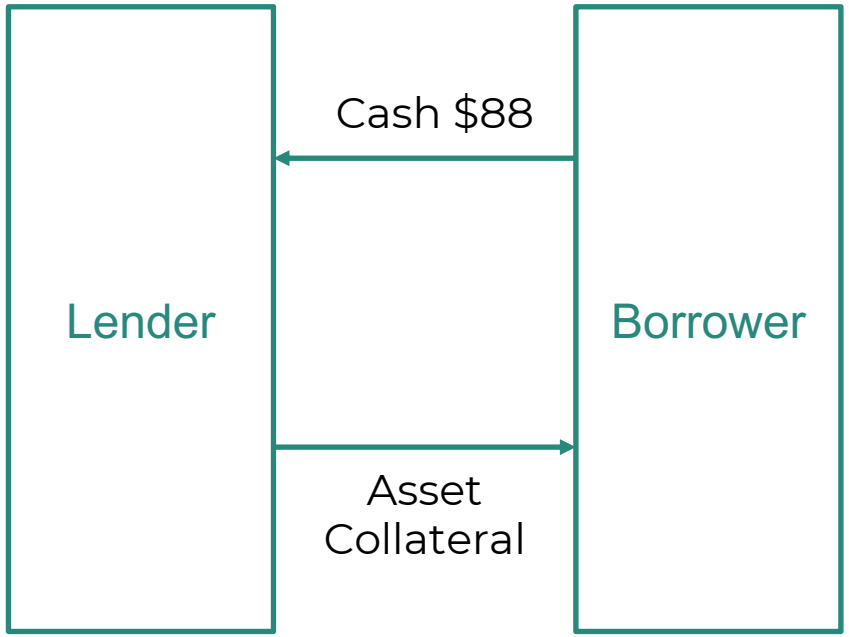
Step One: Sale



Step Two: Buyback



Asset collateral movement can be significantly slower than cash movement. T+2.

Repo with Tokenized Securities

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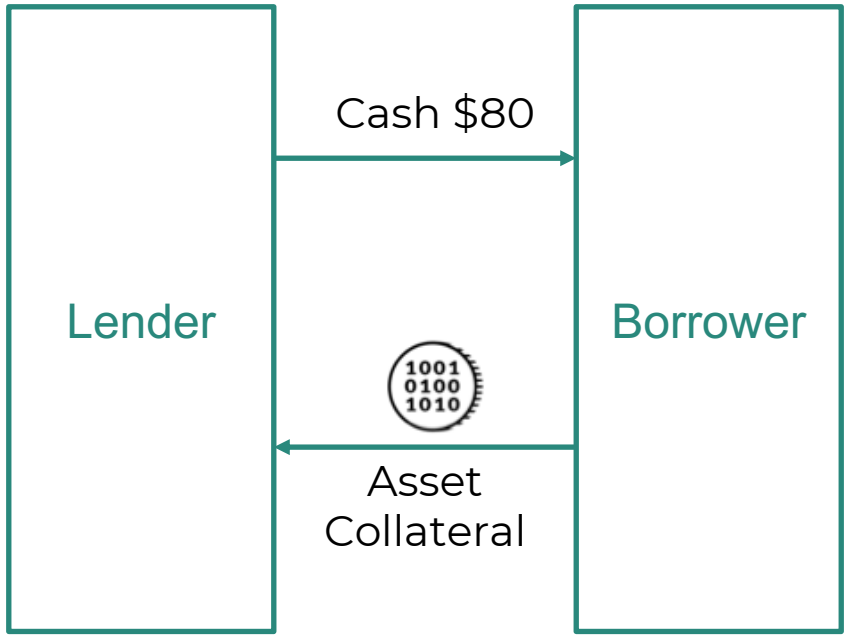
Step One: Sale



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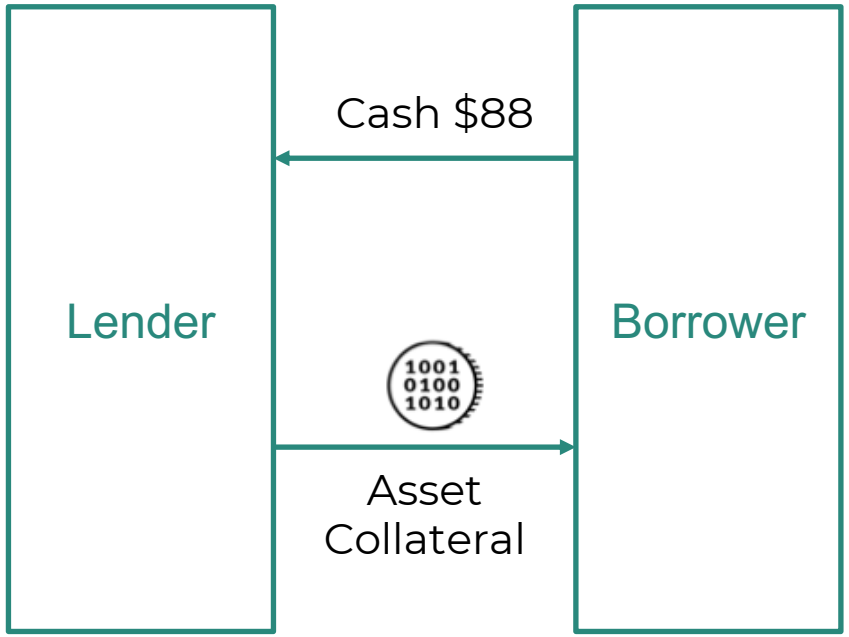

Asset collateral movement can be instant.

Summary

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- Institutional tokens can reduce costs, eliminate settlement latencies, reduce risks, and increase returns
- Present day token transfer systems fall short in delivering these benefits.
- A new token transfer system is required.
- Half Epsilon provides such a token transfer system.

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Thank You!

If you liked this deck, share it!

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