DEUTSCHE BUNDESBANK
EUROSYSTEM

Programmable money: Options for Central Banks

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Money serves many purposes and has many features

2 Euro Finnish Sauna Culture

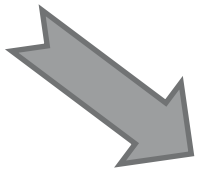
The design shows a Finnish landscape with a typical Finnish lakeside sauna placed in the centre. The date is at the centre bottom. The indication of the issuing country ‘FI’ is at the centre-left and the mint mark at the centre-right. The coin’s outer ring depicts the 12 stars of the European flag.
Engraver*:* Erkki Vainio

Features

Country	Finland
Period	Republic (*1919-date*)
Type	Circulating commemorative coin
Year	2018
Value	2 Euro
Currency	Euro (*2002-date*)
Composition	Bimetallic: nickel brass clad nickel centre in copper-nickel ring
Weight	8.5 g
Diameter	25.75 mm
Thickness	2.2 mm
Shape	Round
Orientation	Medal alignment ↑↑

Having lost sight of our goals we redoubled our efforts.

Mark Twain



What do we need digital money for?

Use Cases for Digital Money

Potential Use Cases for Customers

- M2M Payments: Automatical transfers between facilities, factories, machines, vehicles etc.
- IoT Payments: Triggered by interaction with customer
- Smart Contract as a controller: Time- or event-triggered automatic settlement of a money leg by a smart contract
- Smart Contract as trustee: Using a smart contract to eliminate settlement risk
- Pay-per-Use
- Bi-directional settlement: Settlement of multiple bilateral bi-directional claims
- Cross-Currency Payments: Eliminating of intermediaries, increasing transparency
- 24/7 Payments: Opening hours of payment systems are somehow restrictive
- Payment + information: Integration of payment and communiction systems across business partners (process- and data integration)

Potential Non Use Cases

- Substitution for Cash
  - If consumers don‘t like cash anymore a substitute must have better features
- Facilitating monetary policy: Granting access to central bank money has always been possible

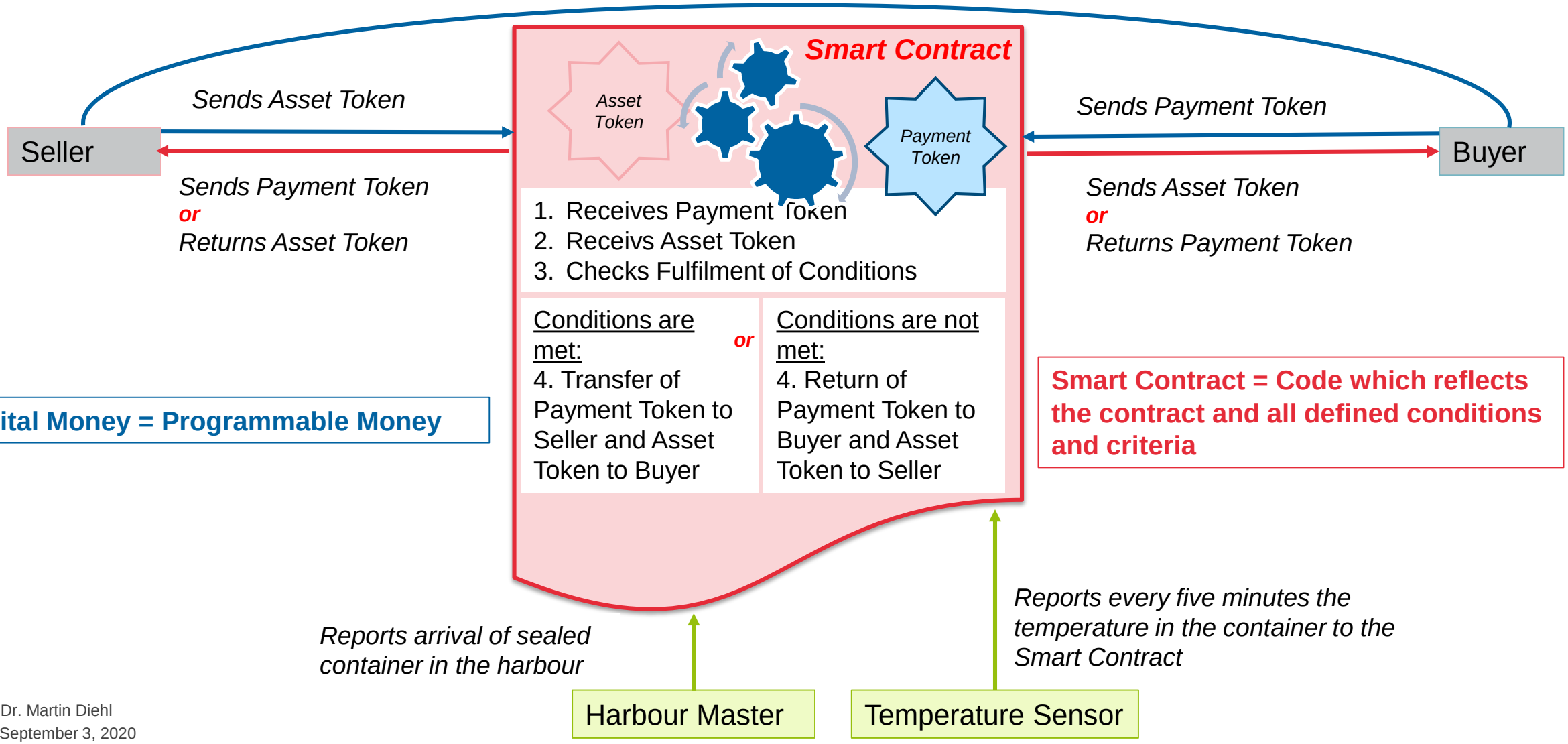
Potential propelling Use Cases

- Issuing digital money by other central banks
- Market penetration of private stable coins

What is meant with the Feature „Programmable“? Example Smart Contract

Contract: Delivering Fish versus Payment

Condition 1: Shipment to Harbour Condition 2: Has been permanent below 2°C



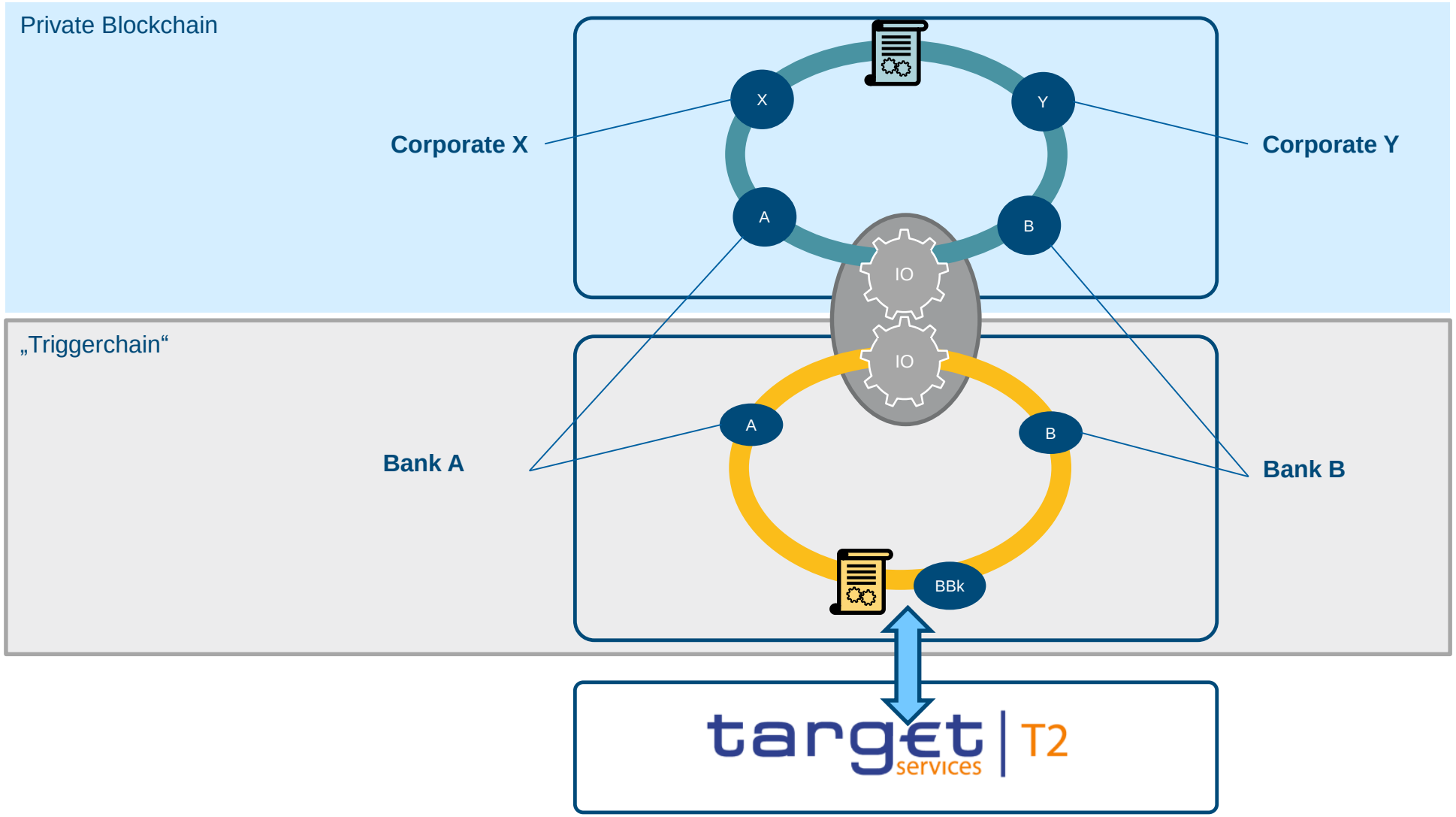
Digital Money = Programmable Money

Smart Contract = Code which reflects the contract and all defined conditions and criteria

Forms of digital or programmable money

Name	Example	Stability	Claim	Backing
Crypto-Token	Bitcoin	Extremely volatile	No	No
Stable Coin	Tether, Libra	Tied to real currency	No / questionable	In commercial bank money
Digital Commercial Bank Money	JP Morgan Coin	Like real currency	On commercial bank	Commercial bank money
Trigger-Solution to ACH	Payment Adapter (LBBW)	Like real currency	On commercial bank	Commercial bank money
Stable Coin (backed in central bank money)	-	Real currency	On Central Bank	In Central bank money
Trigger-Solution to RTGS	-	Real currency	On Central Bank	Central bank money
Central Bank Digital Currency	-	Real currency	On Central Bank	Central bank money

Trigger-Solution - Overview



Trigger-Solution: Arguments

- Technological innovations are facilitated by a tokenized confirmation of payment
- … without granting access to central bank money for non-banks
- DLT-initiated settlement in secure central bank money
- No implications for monetary policy, financial stability and payment services
- Use of the existing infrastructure and the applied regulation
- Neutral towards all techniques: Choice of technology lies with the Corporate Chains
- Implementation within a year at low costs
- Constraint: Operating hours of TARGET2 (solution: TIPS)

Conclusion

- There are many options for central banks to create or facilitate programmable money
- The real of central banks does not have to be widened into the commercial field
- Some options could be implemented fast, at low costs and without much risks
- Digital Central Bank Money is not risk free and not easy to issue