

EUROPEAN CENTRAL BANK

EUROSYSTEM

# ECB work on technological innovation

# ECB Innovation Lab

- 30 October 2019
- BCEAO & World Bank Conference on Fintech Dakar, 24 September 2019

### **Josip Kenjeric** IT Specialist in the ECB's Innovation Lab

www.ecb.europa.eu

# The future has landed







**ECB** approach to technological innovation

# **Distinguish infrastructure from asset**



#### **ECB Innovation Lab**



Collaboration between **market infrastructures and IT departments** within the ECB.

Business and IT experts working on **research topics** in **market infrastructure and payments**. Work within EU central bank community

**EUROchain** 

World's first DLT research network between a larger group of central banks

Main projects



Joint project with Bank of Japan

- Phase1: Wholesale Payments
- Phase2: Delivery vs Payment
- Phase 3: Cross-border payments

#### **The EUROchain Research Network**



The **ECB Innovation Lab** along with experts from **17 European national central banks** explores new technologies (currently DLT) in the field of market infrastructure and payments.

## **Few group characteristics**

- · Different backgrounds
- · Heterogeneous skills
- · Different countries



## **The EUROchain – Events driving innovation**

"Devoting time and energy to finding and testing ideas through a network of diverse individuals gives innovators a radically different perspective." - The Innovator's DNA

6

- · Hackathon
  - Event with focus on innovation
  - Diverse participants
  - Feedback on ideas



**EUROchain** 

Hackathon

EUROcha



### **Bank of Japan / European Central Bank cooperation**



Started: December 2016

Objective: Deepen understanding of DLT

Not geared towards replacing existing central bank services with DLT-based solutions

#### 09/2017 Phase 1: RTGS payments

Bilateral liquidity-saving mechanisms of RTGS (Hyperledger Fabric v0.6)

#### 03/2018 Phase 2: Securities

Delivery versus Payment in sigle and cross ledger scenarios, with Hashed Time-Lock Contracts, HTLCs (*Hyperledger Fabric v1.0.5, Corda v1, Elements*)

#### <sup>06/2019</sup> **Phase 3: Cross border payments**

How to link transactions of a cross border payment using a cryptographic condition. Analysis of different payment methods (Hyperledger Fabric, Five Bells Ledger)



#### **Report 1: Wholesale Payments**

## **Main findings**

## **Performance**

Some DLT can meet the current performance needs of RTGS without difficulty (100 TPS)

Liquidity-saving mechanisms not a major factor for latency (adding 0.01-0.02 seconds)

DLT performance is affected by distance between nodes

## **Availability**

DLT solutions are resilient to the failure of network nodes

Validating nodes recovered in less than 30 seconds on crash faults

Denial of Service attack with incorrect message format added latency but below 1 second



#### **Report 2: Delivery vs. Payment**

## **Main findings**

DLT offers new approach to DvP without technical connection between ledgers (cross-chain atomic swap)

This new interoperability approach entails complexities and additional risks (e.g. higher liquidity needs)



#### **Report 3: Synchronized cross-border payments**

# **Main findings**



STEL

Example of a payment chain, composed of multiple payments across different ledgers:

- Payments are linked via a cryptographic condition like in the Inter-Ledger Protocol (ILP).
- Each payment is carried out with a specific payment method, depending on the arrangement between the parties. Stella3 analyses **5 payment methods**.

Some of the payment methods, in particular those having enforcement mechanisms:

- can ensure that each transacting party who completely satisfies its responsibilities is not exposed to the risk of incurring a loss on the principal amount being transferred
- could potentially improve the safety of today's cross-border payments business

# Internal Crypto-Assets Task Force, ICA-TF

 An ECB Internal Crypto-Assets Task Force was established in March 2018 with the mandate to deepen the analysis on crypto-assets and is comprised of 15 business areas







ECB analysis on crypto-assets

#### ICA-TF

Crypto-assets are not to be considered as virtual currencies or digital currencies although these terms are often (inaccurately) used to identify crypto-assets that are used and accepted by some as a substitute for money in particular circumstances



 The absence of any specific institution (such as a central bank or monetary authority) protecting the value of crypto-assets hinders their use as a form of money

## **Taxonomy of stablecoins with the crypto cube**





ECB stance



Technological innovation such as DLT has the potential to profoundly impact the financial market we know today. But any new technology-based market infrastructure service needs to be mature enough to meet high requirements in terms of safety and efficiency.

Against this background, the ECB cannot, at this stage, consider basing its market infrastructure on a DLT solution.

The ECB will continue to explore, analyse and test new technologies. In doing so we will ensure that tomorrow's market infrastructure not only is efficient and innovative but also remains safe and resilient.

# Thank you!



www.ecb.europa.eu/paym/ youtube.com/ecbeuro www.twitter.com/target\_ecb