MODULE:

2.2

Blockchain Payments

BESIDE

Blockchain usE caSes In Digital financE

Blockchain usE caSes In Digital financE – BESIDE – 2022-1-DE02-KA220-VET-000089587 is funded by Erasmus+.
The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Co-funded by the European Union

OUTLINE

Co-funded by the European Union

CHAPTER:

1.

Introduction

BESIDE
Blockchain usE caSes In Digital financE

Co-funded by
the European Union

INTRODUCTION

Digital Payments

In the modern era, the way we handle payments has undergone a dramatic transformation.

Digital payments have emerged as a cornerstone of our financial interactions, offering unparalleled convenience, security, and accessibility.

Traditional cash transactions have largely given way to the digital realm, especially with more and more commerce being facilitated via the internet.

Co-funded by the European Union

INTRODUCTION

Digital Currency Payments

Blockchain represents a revolutionary approach to digital payments by introducing decentralisation and transparency.

In this module, we'll explore how blockchain technology is shaping the future of payments, delving into various facets, including **stablecoins**, **payment tokens/e-money**, the **Lightning Network**, and **Central Bank Digital Currencies** (CBDCs).

Co-funded by the European Union

CHAPTER:

2.

Digital Payments

BESIDE
Blockchain usE caSes In Digital financE

Co-funded by the European Union

DIGITAL PAYMENTS

BESIDE
Blockchain usE caSes In Digital financE

Digital payments have long been seen as an alternative to cash payments

Digital currencies don’t require an intermediary and can be viewed as a digital form of cash

Pre-blockchain, digital payments relied on a variety of middlemen such as payment facilitators, custodians, etc. These middlemen had several potential drawbacks over cash payments both for merchants and users.

Using digital currencies for payment facilitation offers several advantages.

Co-funded by the European Union

DIGITAL PAYMENTS

Advantages of utilising digital currencies for payment facilitation include:

Efficiency

Payments involve only two parties, the payer and payee. Depending on the network design there may also be major efficiency gains in terms of settlement speed and cost.

Security

All transactions are validated by a decentralised network and once added to a block they are permanently settled.

Accessibility

Digital currencies are location agnostic. It doesn't matter where a merchant is, what volume they settle, etc. All that is needed is a digital currency wallet.

Co-funded by the European Union

ACCEPTING DIGITAL PAYMENTS

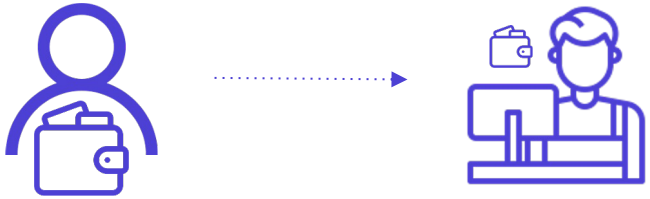
There are many ways for merchants to accept digital currency payments. The simplest are direct wallet-to-wallet transactions, in which a customer sends funds directly to a merchants wallet from their own wallet.

Other methods may offer advantages such as transaction fee optimisations, integrated currency conversions, etc.

Available methods aside from wallet-to-wallet include **payment service providers**, **crypto debit cards**, **payment gateways**, etc.

WALLET-TO-WALLET TRANSACTIONS

Direct wallet-to-wallet transactions are the simplest form of digital currency payments.



Co-funded by the European Union

ACCEPTING DIGITAL PAYMENTS

Accepting wallet-to-wallet transactions is very simple and can be set up in 30 minutes.

1 Set Up a Digital Wallet

Choose a reputable and secure wallet for the cryptocurrency you plan to accept. There are various types of wallets, including hardware wallets, software wallets, and online wallets.

2 Select Accepted Currencies

Research and decide which cryptocurrencies are relevant to your business and target audience. Different currencies have different pros and cons. They may also require different wallets.

3 Customer Makes Payment

Ensure that customers receive clear instructions on how to make cryptocurrency payments. Include details like the amount, the cryptocurrency to use, and the generated address.

4 Confirmation and Settlement

Once a payment has been sent by a customer, it may take between a few seconds, and several minutes for the transaction to be confirmed by the network, depending on network and fees paid.

Co-funded by the European Union

DIGITAL PAYMENTS

PROS

Using an **intermediary**, like for example BitPay to accept digital currencies offers several advantages and disadvantages. The PROS:

- **Simplicity:** Intermediaries provide user-friendly tools for accepting digital currencies, simplifying the setup process.
- **Reduced Price Volatility Risk:** Intermediaries can convert received cryptocurrency payments into fiat currency, reducing the impact of price volatility.
- **Wider Payment Options:** Businesses can expand their payment options by accepting various digital currencies through a single intermediary.
- **Enhanced Security:** Intermediaries offer added security measures to protect against fraud and chargebacks.
- **Simplified Tax Reporting:** Some intermediaries provide tools for tracking and reporting cryptocurrency transactions, streamlining tax compliance.

PROS

Co-funded by the European Union

DIGITAL PAYMENTS

CONS

- **Transaction Fees:** Intermediaries charge various fees, potentially reducing a business's profitability.
- **Centralisation:** Using an intermediary may compromise some decentralisation benefits of cryptocurrencies.
- **Limited Control:** Intermediaries can impose restrictions on accessing and using cryptocurrency funds, limiting flexibility.
- **Regulatory Risks:** Evolving cryptocurrency regulations require businesses to stay informed about changing rules.
- **Dependency:** Relying on an intermediary makes a business dependent on its availability and performance.
- **Privacy Concerns:** Intermediaries may collect and store customer data, raising privacy concerns.

CONS

Co-funded by the European Union

BESIDE
Blockchain usE caSes In Digital financE

Transaction Fees

Wallet-to-wallet cryptocurrency transactions can be hindered by scalability issues and high transaction fees. Blockchain networks may face congestion, leading to slower processing times, especially during periods of increased activity.

Different blockchain networks are able to process transactions at different rates. Bitcoin, for example, mines a new block on average every 10 minutes. Each block is limited to about 1mb in size. This limits the rate at which transactions can be processed by the network.

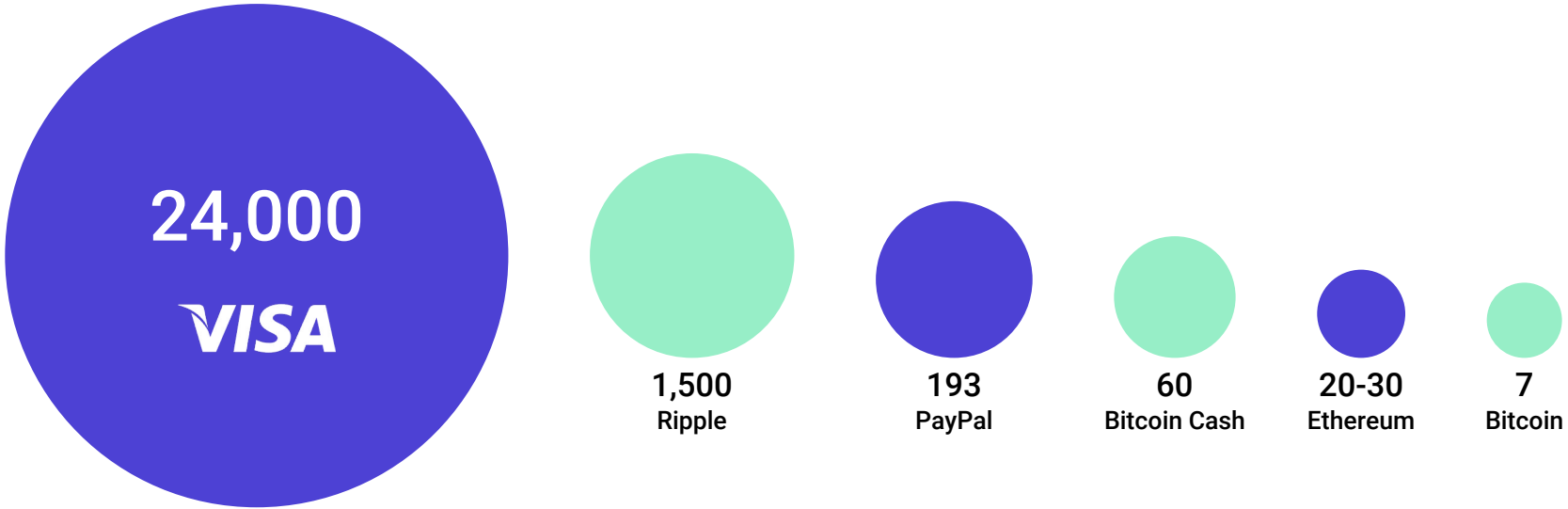
Users bid to have their transaction verified in the form of transaction fees. A higher fee means that ones transaction will be verified sooner. Different networks have different limitations.

Co-funded by the European Union

ACCEPTING DIGITAL PAYMENTS

Due to their respective network design, different platforms are able to process a different number of transaction per second.

(TPS)



Co-funded by the European Union

DIGITAL PAYMENTS

Applications of blockchain technology reach well past the realm of cryptocurrency. It simplifies the payment process by enabling direct transactions between peers, cutting out middlemen and diminishing the risk of fraud.

Transactions are completed instantaneously, providing a transparency and speed that conventional systems cannot match. Stablecoins, payment tokens, and Central Bank Digital Currencies (CBDCs) are established and exchanged upon this foundation.

Co-funded by the European Union

CHAPTER:

3.

Scalability & Second Layers

BESIDE
Blockchain usE caSes In Digital financE

Co-funded by the European Union

SCALABILITY TRILEMMA

The scalability trilemma in blockchain refers to the challenge of achieving three key properties simultaneously:

Decentralisation: The ability for the blockchain to be operated by many participants, ensuring there is no central point of control or failure.

Security: The ability to defend against attacks and secure the integrity and immutability of the blockchain data.

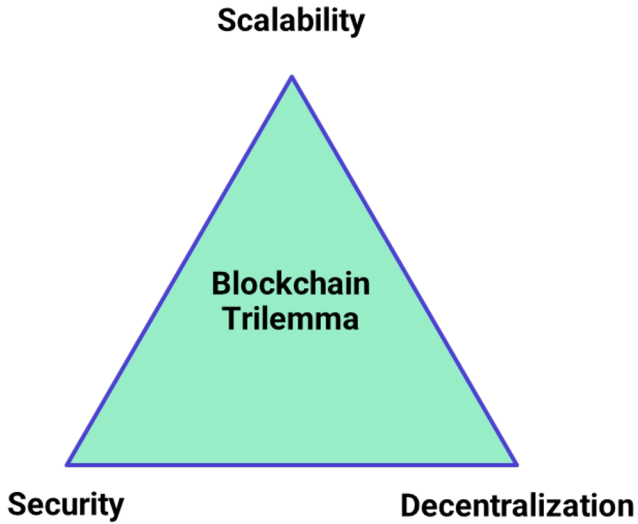
Scalability: The ability of the blockchain to process a high volume of transactions quickly and efficiently.

The trilemma posits that, given current technology, a blockchain system can only at most have two of the three properties. For instance, a system could be decentralised and secure but then struggle with scalability (as seen with Bitcoin and Ethereum). Alternatively, increasing scalability could compromise security or lead to centralisation.

Co-funded by the European Union

SCALABILITY TRILEMMA

The **scalability trilemma** is a concept in blockchain and cryptocurrency design that highlights a trade-off between three critical attributes: decentralisation, security, and scalability.



Co-funded by
the European Union

SECOND LAYERS

Second layers, or layer 2 solutions, are systems built on top of an underlying blockchain (the "first layer") to enhance its scalability and throughput without compromising on decentralisation or security — directly addressing the scalability trilemma. Here's how they fit with the trilemma:

Decentralisation: Layer 2 solutions inherit the decentralisation from the underlying blockchain. By offloading transactions from the main chain, these solutions maintain the distributed nature of the network while handling more transactions.

Security: They leverage the robust security mechanisms of the underlying first-layer blockchain. Transactions on a second layer are eventually settled on the first layer, which means they are secured by the same consensus mechanisms and immutability guarantees.

Scalability: This is the primary focus of layer 2 solutions. They enable the network to handle a much larger number of transactions by processing them off the main chain.

Co-funded by the European Union

SECOND LAYERS

There are several approaches taken by second layers to increase transaction throughput while reducing transaction costs for users:

State Channels: Allow participants to transact multiple times with only two on-chain transactions: one to open the channel and one to settle the final state.

Sidechains: Independent blockchains that run parallel to the main chain, with their own consensus mechanisms but linked to the main chain.

Rollups: Transactions are processed in batches off-chain and then recorded as a single transaction on the main chain, significantly reducing the data that the main chain has to process.

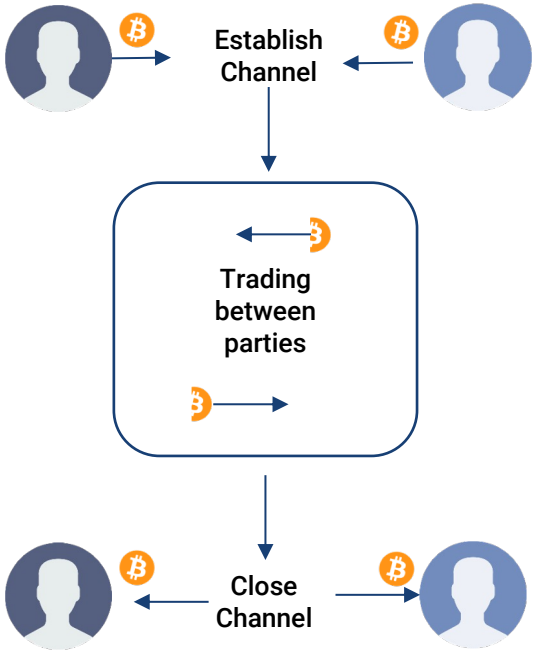
Plasma: Creates child blockchains that are anchored to the main chain and roll up transactions into a single block that gets recorded on the main chain.

Co-funded by the European Union

BITCOIN LIGHTNING

The **Lightning Network** is a second-layer scaling solution for the Bitcoin blockchain, designed to overcome its scalability and speed limitations. It operates off-chain, allowing users to create payment channels and conduct fast, low-cost transactions (negligible fees) without the need for on-chain confirmation.

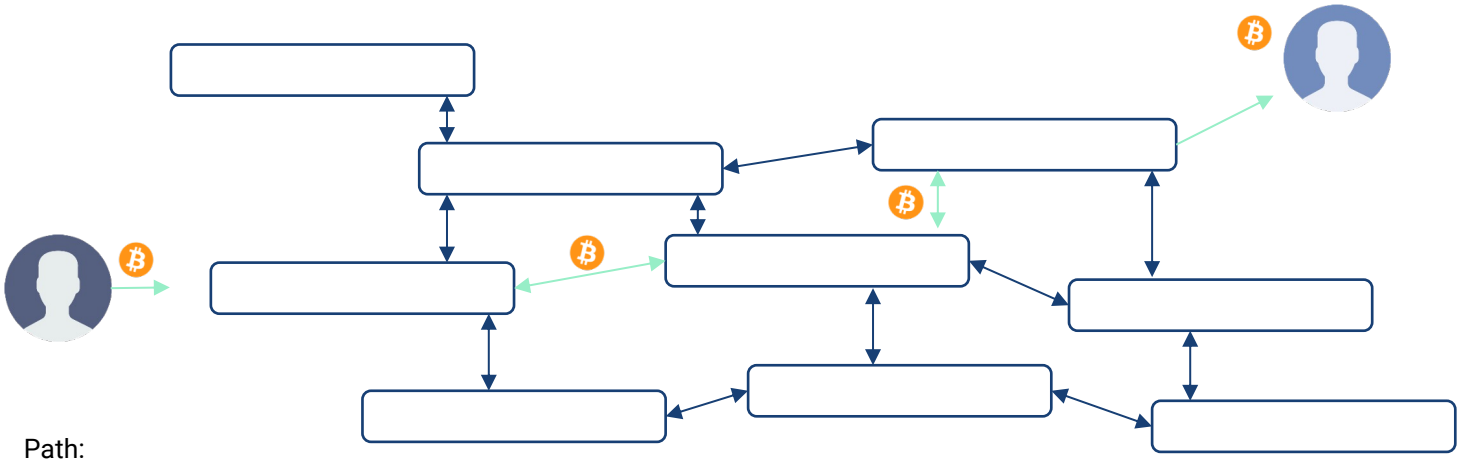
The Lightning Network uses **state channels**.



Co-funded by
the European Union

BITCOIN LIGHTNING

Lightning channels are able to communicate with one another. This way, users who don’t have a channel between them are still able to use the Lightning Network via multi-channel routing.



Path:
- Enough Capacity
- Shortest Route
- Lowest Fee

Co-funded by the European Union

BITCOIN LIGHTNING

Merchants running their own Lightning node can gain advantages such as increased control, reduced fees, improved privacy, and enhanced network connectivity.

By operating their Lightning node, merchants can manage payment channels, set fee structures, and control the running of their Lightning node which requires technical expertise and ongoing maintenance.

Running a lightning node can be done relatively easily, using affordable hardware (e.g. a raspberry pi)

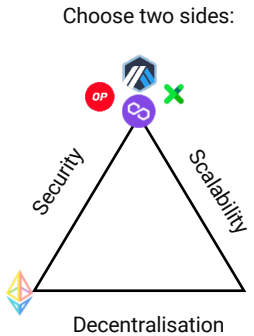
Co-funded by the European Union

ETHEREUM SECOND LAYERS

There are many second layers available on Ethereum. All aiming to increase transaction throughput and reducing transaction fees. They arguably make trade-offs for these improvements. Popular second layers on Ethereum include:

Optimism **Matic** **Gnosis** **Arbitrum**

Scalability Trilemma



Co-funded by the European Union

CHAPTER:

4.

Payment Tools

BESIDE
Blockchain usE caSes In Digital financE

Co-funded by
the European Union

STABLECOINS

Stablecoins are a category of cryptocurrencies designed to maintain a **stable value**, often by being pegged to a reserve asset or a basket of assets, such as fiat currencies (e.g., USD, EUR) or commodities (e.g., gold).

The primary feature of stablecoins is their **price stability**. They aim to minimise the price volatility commonly associated with cryptocurrencies like Bitcoin and Ethereum.

They are used for a wide range of purposes, including as a medium of exchange, a store of value, a unit of account, and a way to facilitate remittances and cross-border payments.

Co-funded by the European Union

STABLECOINS

Stablecoins can be categorised into **three main types**:

Fiat-Collateralised: Backed by a reserve of fiat currency, where each coin is backed by a corresponding amount of the reserve currency.

Crypto-Collateralised: Backed by other cryptocurrencies, typically held in a smart contract as collateral, to ensure price stability.

Algorithmic or Non-Collateralised: These stablecoins maintain their value through algorithmic mechanisms and do not rely on traditional assets as collateral.

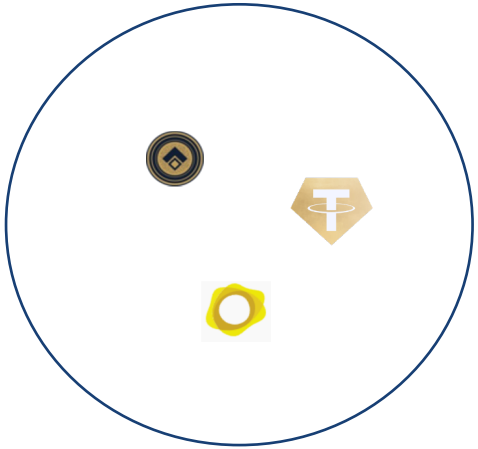
Co-funded by the European Union

REVIEW: STABLECOINS

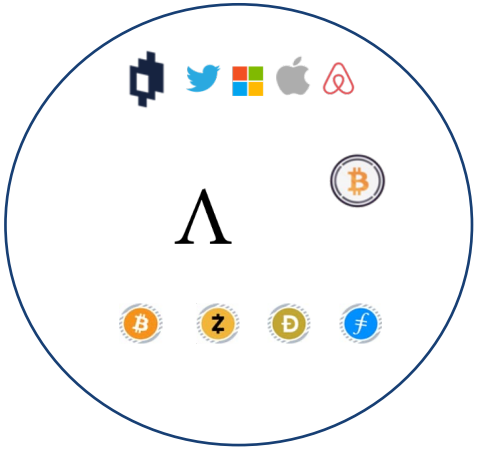
BESIDE
Blockchain usE caSes In Digital financE

Stablecoins are a type of cryptocurrency that attempts to peg its market value to some external reference asset.

Fiat Currency



Precious Metals



Other

Co-funded by the European Union

CBDCs

Central Bank Digital Currencies (CBDCs) are a rapidly evolving and highly significant development in the world of finance and economics. CBDCs are digital forms of a country's national currency that are issued and regulated by the central bank, as opposed to traditional physical cash and commercial bank deposits.

Co-funded by the European Union

CBDCs

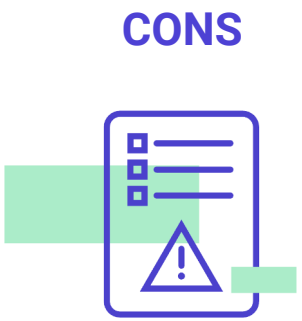
PROS

- **Financial Inclusion:** CBDCs have the potential to improve financial inclusion by providing access to financial services for underserved populations. People without traditional bank accounts can use CBDCs as long as they have access to a digital device.
- **Monetary Policy:** Central banks can implement monetary policy more effectively through CBDCs. They can directly influence the money supply, interest rates, and inflation by controlling the issuance and circulation of CBDCs.
- **Transparency:** Transactions using CBDCs can be tracked and audited more easily, reducing the potential for illicit activities like money laundering and tax evasion.

Co-funded by the European Union

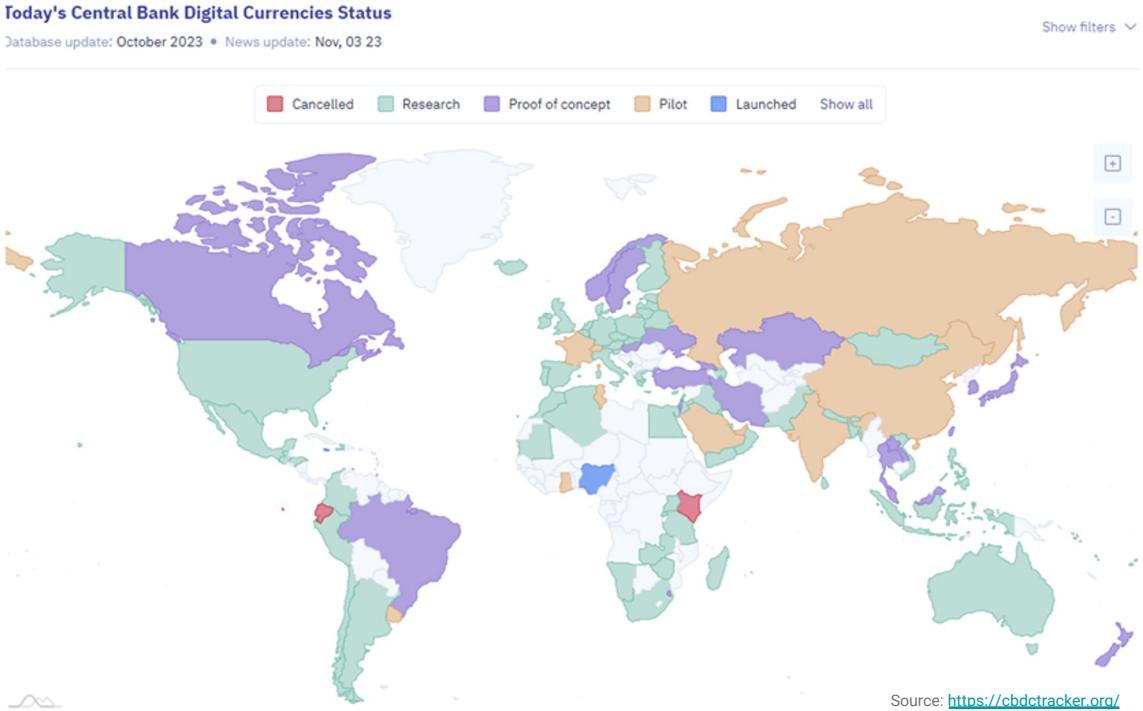
CONS

- **Privacy Concerns**: The transparency of CBDC transactions can also raise concerns about individual privacy. Some people worry that governments could monitor and potentially misuse transaction data.
- **Bank Disintermediation**: If CBDCs become widely adopted, commercial banks may see reduced demand for their services, leading to job losses and potentially undermining the stability of the traditional banking system.
- **Operational Risks**: Central banks would need to manage the issuance and redemption of CBDCs effectively, avoiding operational errors that could disrupt the financial system.



Co-funded by the European Union

CBDCs



Source: https://cbdctracker.org/

Co-funded by the European Union

ADVANCED PAYMENT TYPES

Streaming Money

Streaming money is the concept of continuous, real-time payments, almost like streaming data, allowing for the flow of value to be as fluid and uninterrupted as streaming music or video.

Micropayments

Micropayments refer to very small financial transactions, typically online and in fractions of traditional currency units, enabling the purchase of low-cost goods and services or monetising content piece by piece.

Automated

Self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of code, which automatically trigger payments upon fulfillment of specified conditions without human intervention.

Co-funded by the European Union

CHAPTER:

5.

Conclusions

BESIDE
Blockchain usE caSes In Digital financE

Co-funded by
the European Union

CONCLUSIONS

- ➔ Digital Payments allow merchants and their customers to greater autonomy
- ➔ Transaction fees on many public blockchains may be very high, second layers are needed
- ➔ Stablecoins and central bank digital currencies allow mitigation of volatility issues
- ➔ Advanced types of digital payments may enable new business models

Co-funded by the European Union

CONTACTS

BESIDE
Blockchain usE caSes In Digital financE

e-mail: info@besideproject.eu

Website: www.besideproject.eu

LinkedIn: https://www.linkedin.com/company/besideproject/

Blockchain usE caSes In Digital financE – BESIDE – 2022-1-DE02-KA220-VET-000089587 is funded by Erasmus+.
The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Co-funded by the European Union