

Multi CBDC Bridge Use Case Proposal

October 2021



New forms of digital money could spur growth

“For over 150 years, HSBC has been at the forefront of financial innovation, constantly looking for ways to make banking easier and better for our clients.

Today, in the context of the digital revolution, we are fundamentally improving the way we operate – particularly how we interact with customers, process payments and facilitate investment, all over the world.”

“CBDCs could help to spur further economic growth by making payments and settlements more efficient and cheaper. They could also fuel innovation across the financial sector. The near instant nature of CBDC payments is likely to lower the cost of issuing and trading bonds and other securities – and may also help with fiscal and monetary policy objectives by providing a means of making direct transfers to consumers to stimulate demand.”

Noel Quinn, HSBC Group Chief Executive¹

¹[New forms of digital money could spur growth | Insight | HSBC Holdings plc](#)

Use Case 1

Crossborder Commercial Payments

1.1 Introduction

Crossborder payments are often perceived to face challenges of high costs, low speed, limited access and insufficient transparency. Bank for International Settlement (BIS) had identified seven key issues for crossborder payments under the current correspondent banking settlement model:

- ◆ Fragmented and truncated data formats
- ◆ Complex processing of compliance checks
- ◆ Limited operating hours
- ◆ Legacy technology platforms
- ◆ Long transaction chains
- ◆ Funding costs
- ◆ Weak competition

BIS had been at the forefront in leading the industry and international bodies to address these issues, and in their report to the G20 BIS had presented recommendations proposed by The Committee on Payments and Market Infrastructures (CPMI) with regards to necessary building

blocks to improving the current global crossborder payment arrangements.

One of the 5 focus areas is to explore the potential role of new payment infrastructures and arrangements, and Central Bank Digital Currencies (CBDC) was identified as an enabler and catalyst to potentially remove barriers to the emergence of new crossborder payment infrastructures and arrangements.

HSBC had participated into the Inthanon-Lionrock crossborder CBDC project led by the Hong Kong Monetary Authority (HKMA) and Bank of Thailand (BoT) exploring the merits of a crossborder CBDC platform. The study clearly demonstrated technological readiness and potential benefits of applying Distributed Ledger Technologies (DLT) to CBDC for crossborder payments.

HSBC is excited about the extension of the Inthanon-Lionrock project to include two additional central banks – People's Bank of China (PBoC) and Central Bank of United Arab Emirates (CBUAE) under BIS Innovation Hub to further develop the use case of commercial crossborder payment via a multi-lateral CBDC platform.

Crossborder payments are often perceived to face challenges of high costs, low speed, limited access and insufficient transparency.

1.2 Top challenges in crossborder commercial payments settlement:

Of the seven key issues identified by BIS², HSBC is keen to explore using wholesale CBDC to address four major obstacles facing crossborder payments:

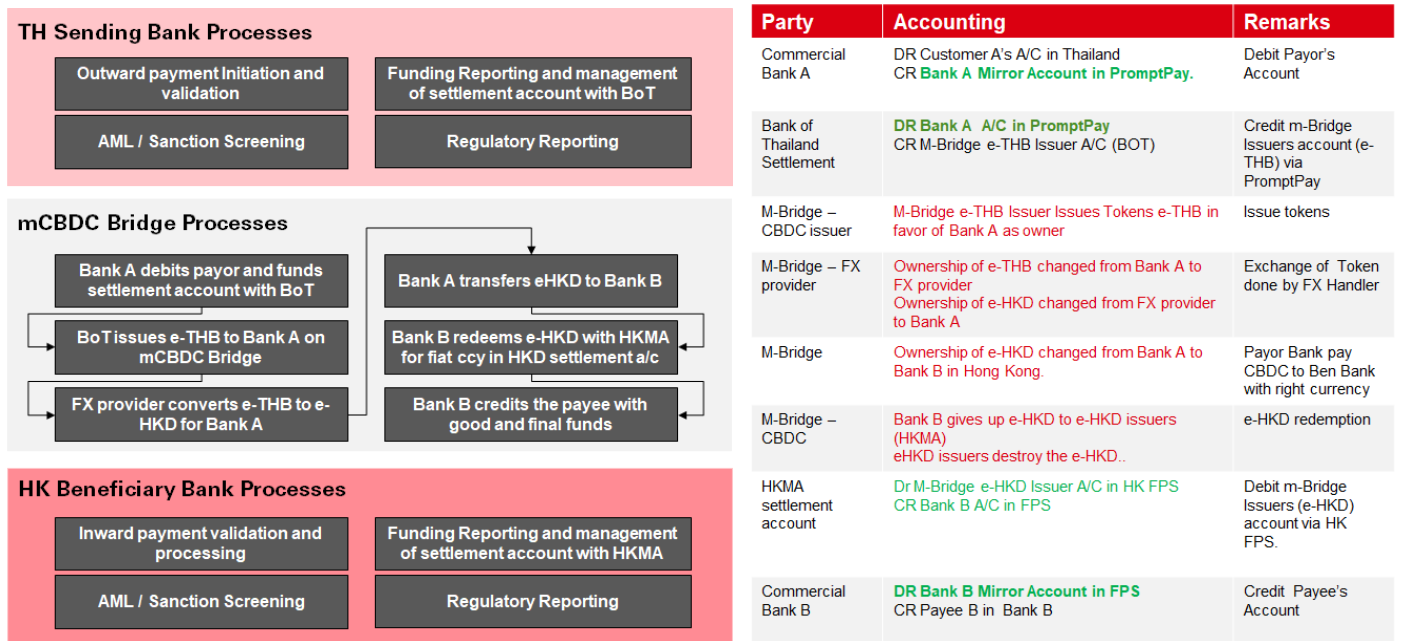
- 1) **Complex processing of compliance checks** – Today’s crossborder payments often carry limited or unstructured data. To ensure that compliance banks have to manage a large number of sanctions and compliance requirements that adds cost and processing time for crossborder payments.
- 2) **Limited Operating Hours** – Processing of crossborder payments today is dependent on domestic clearing systems that operate in limited hours across different time-zones. This prohibits the implementation of an efficient 24x7 real-time crossborder payment model.
- 3) **Long Transaction Chains** – Crossborder payments based on the current correspondent banking settlement model rely on multiple intermediaries to transmit the funding and/or the payment message. This is due to the high cost of establishing point-to-point connectivity with large number of counterparties.
- 4) **Funding Costs** – settlement of crossborder payments is highly dependent on available funding. To rationalise funding costs for crossborder payments facilitation, banks have to adopt a value-day approach to net in- and out-flows before funding their nostro and/or settlement accounts.

Multiple approaches had been explored to solve these crossborder settlement pain-points including enhancement to existing global payment network, connecting domestic real-time payments systems, and expanding intra-bank closed-loop transfer network. Each approach has its pros and cons and we believe wholesale CBDC via mBridge can provide us with another promising approach to resolving these issues.

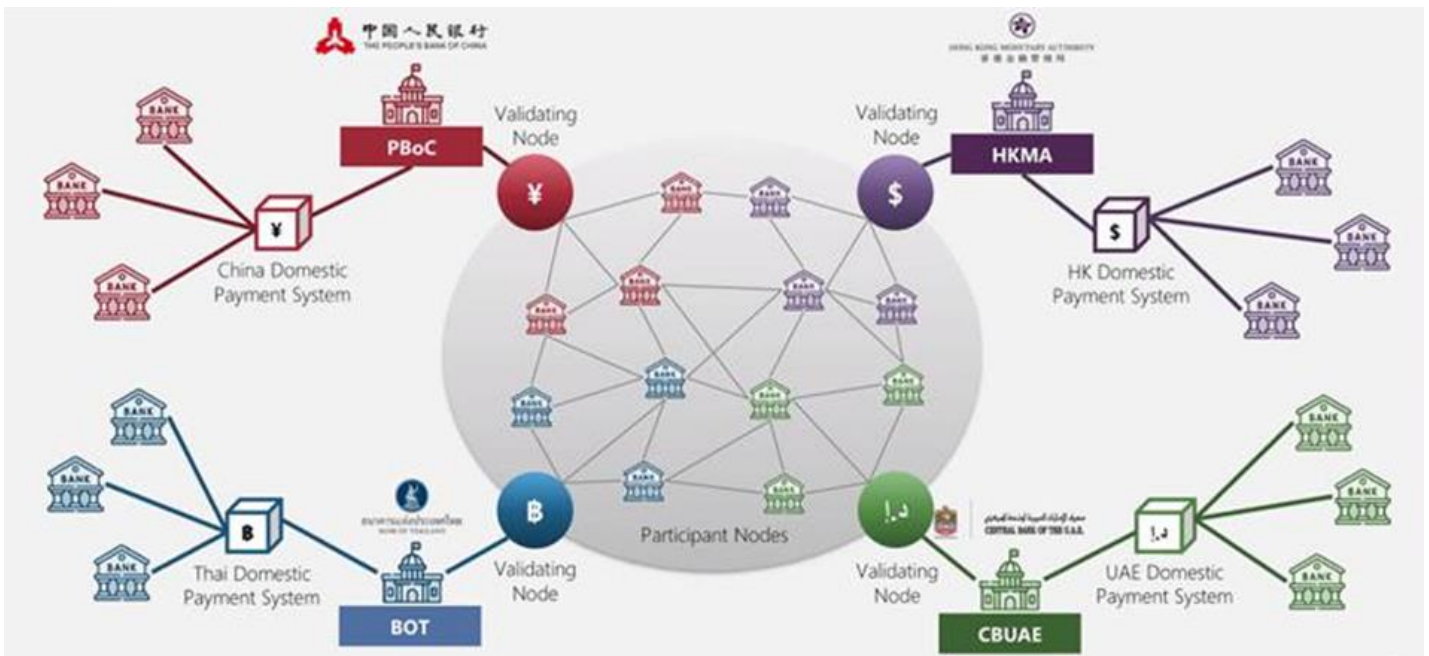
² [Enhancing cross-border payments: building blocks of a global roadmap \(bis.org\)](https://www.bis.org/publ/ncg/ncg030.htm)

1.3 Enhanced crossborder payment process enabled by mBridge wholesale CBDC settlement:

The flow diagram below illustrates a wholesale CBDC settlement process of a hypothetical crossborder commercial payment from Thailand to Hong Kong via the mBridge platform:



The chart below outlines the conceptual model³ of mBridge connectivity between local clearing systems, central bank settlement accounts, central bank validating nodes, and on-chain CBDC participating nodes for commercial banks:



³ Source: Hong Kong Monetary Authority

1.4 Opportunities enabled by mBridge for crossborder commercial payments settlement:

HSBC is keen to explore using the mBridge for crossborder commercial payments settlement. The aforementioned pain-points may potentially be addressed:

- ◆ **Enhanced RegTech Capabilities** – CBDC designs allow for full traceability enabled by DLT technology, there is a unique opportunity for commercial banks, regulators, and international bodies to work together to explore new ways to use technology to enhance anti-money laundering, sanction screening, fraud monitoring, and financial crime risk mitigation. Instead of relying on exhaustive and duplicated pre-screening for all parties to a transaction, there would be an opportunity to realise a more centralised and streamlined model to handle compliance checks.
- ◆ **Extended Operating Hours** – with the mBridge being an independent infrastructure decoupled from local clearing systems, there is an opportunity for banks to provide 24x7 real-time crossborder payments with settlement finality on the platform via CBDC. The programmable nature of DLT smart-contracts that constitutes the CBDC would also have the potential to be used for more automated, event-triggered, or conditional settlement between participants.

- ◆ **Reduced Complexity** – the DLT-based mBridge model inherently guarantees point-to-point connectivity for all participants on the network. With appropriate onboarding model agreed between the central banks supported by necessary legal and regulatory framework, this may significantly reduce the cost for each commercial banks to onboard, monitor, and maintain relationships with each other in the current correspondent banking model.
- ◆ **Lowered Funding Costs** – with CBDC fully-backed and regulated by central banks, it enabled central banks to review the funding model and requirement for CBDC-based settlement. System-wide Liquidity-Saving-Mechanisms (LSM) including receipt-reactive model or balance-reactive model can be more effectively deployed to achieve lower funding costs for settlement of these CBDC-based crossborder payments.

1.5 Expected benefits to customers:

Through the mBridge PoC project, we aim to explore mBridge as an enabler to allow cheaper, faster, and more transparent crossborder payments to our customers. While there are a number of dependencies on the technical, regulatory, legal, and commercialisation frameworks to realise all potential benefits, HSBC is committed to explore and support payments innovation enabled by CBDC. The realisation of 24x7 real-time crossborder settlement will also enable further specific use cases discussed in the subsequent sections.

We aim to explore mBridge as an enabler to allow cheaper, faster, and more transparent crossborder payments to our customers.

Use Case 2

Programmable Trade Finance

2.1 Introduction

Crossborder trade has long been a significant part of international payments. Digital advancements such as e-marketplaces and internet banking are defining new client expectations in regard to the transparency, speed and cost of international payments. This is driving towards a simpler, more transparent and more instantaneous payment experience.

Despite the COVID-19 pandemic, there has been a strong recovery in merchandise trade since 3Q2020, especially in Asia with 21 percent y-o-y jump in merchandise export volume in the 1Q2021⁴. With recovery in trade and higher digitisation requirements among clients, it is essential to starting to transform crossborder payments to facilitate more international trade.

This section examines the existing challenges faced by corporate clients in trade-related settlement. It then

details the enhanced trade-related payment workflow from leveraging the Multi-CBDC Bridge (mBridge) infrastructure and sets out the expected benefits to corporate clients if mBridge could be used to facilitate international trade-related payments.

2.2 Existing challenges in trade settlement

1. Transparency of payment

For many decades, crossborder payments processes have been complex leading to difficulties for many trading partners. For example, payments often could not be tracked end to end.

Corporates often need to enquire about their payment by calling a bank's customer service hotline and the bank may not possess the latest information about the payment. Banks may need to send a chaser to their

⁴ World Trade Statistical Review 2021

counterparty bank and other correspondent banks and the delay could last for a few days.

2. Time intensive manual payment process

Human intervention from FIs is required to facilitate payment when information is missing or incorrect. When sanctions filters raise a flag, additional information is required from the payment initiator to assess if the hits are genuine or false positives. In addition to sanction hits, wrong remittance details provided by the initiator will also trigger these manual enquiries.

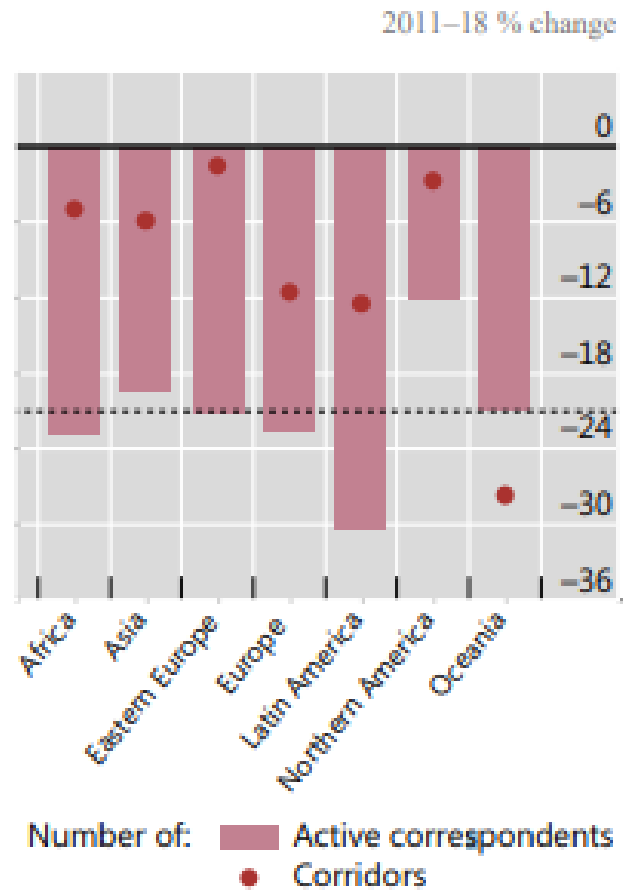
These enquiries will take place through a sequential process to reach the initiating bank to ask their clients for clarification. Delays could take up to a few days as these enquiries take place across different time zones, cut-off times and even holidays. This could lead to a negative impact to a client's business (e.g. missed shipments).

3. Unpredictable crossborder payment fees

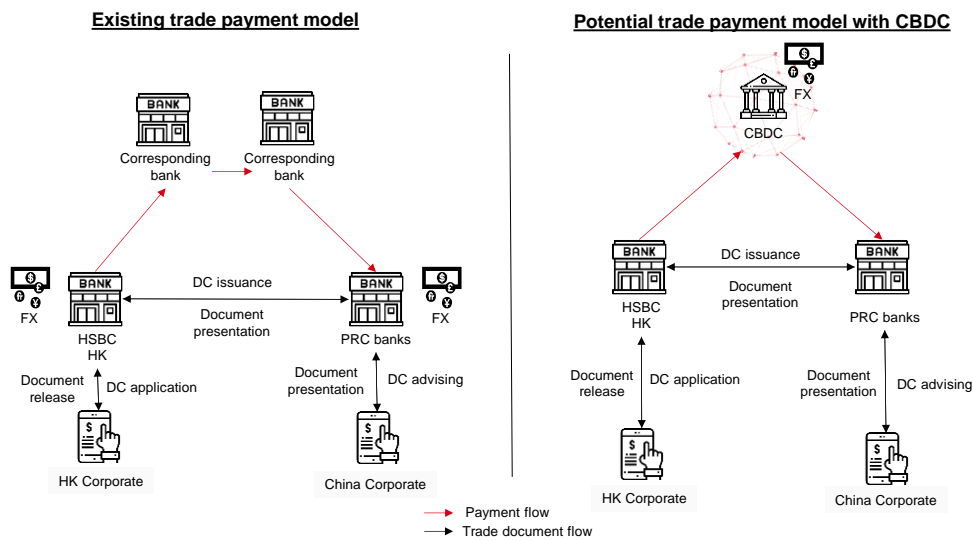
The existing crossborder payment leverages the correspondent banking model which involves FIs establishing reciprocal accounts with each other. However, the number of correspondent banking relationships has fallen globally by 20% from 2011 to 2018⁵, with the decline affecting almost all regions and countries.

In certain scenarios where the initiating bank does not maintain an account with the beneficiary bank, the intermediary bank (which has an account in both the initiating and beneficiary banks) will move the fund from one bank to the other and a service charge will be incurred.

The current crossborder payment model is complex and involves multiple intermediaries, which may lead to unpredictable increases in payment fees.



⁵ SWIFT BI Watch, National Bank of Belgium and Enhancing Cross-border Payments Stage 1 report to the G20: Technical background report



2.3 Enhanced trade payment workflow

Digitisation has become a prominent trend within trade finance in the past few years. Various platforms have emerged that aim to leverage the latest distributed ledger technology (e.g. Contour and eTradeConnect) to enhance trade payment workflows.

However, the existing payment infrastructure and trade platforms are two separate processes to corporates. This legacy design not only fails to provide transaction parties with an end-to-end visibility, but it also contributes to delays and errors.

CBDC may be designed to connect with digital trade platforms and connect the two digital islands: namely trade and payment services for corporates. This creates an end-to-end digitalised client experience. With this connectivity, a CBDC not only makes trade payments faster and more transparent, but also potentially allows FIs to provide clients with a more comprehensive trade finance solution.

A CBDC not only makes trade payments faster and more transparent, but also potentially allows FIs to provide clients with a more comprehensive trade finance solution.

2.4 Expected benefits to customers

1. Real-time, end-to-end tracking

Fundamental to the mBridge infrastructure is the one single payment network connecting commercial banks in various jurisdictions through respective real-time gross settlement systems (RTGS). Benefiting from a clean state payment infrastructure, mBridge enables FIs and their clients an end-to-end and real-time 24/7 visibility in payment status and completion.

Compared to the traditional payment process where FIs need to a sequential approach to enquire about issues, the design of CBDC infrastructure potentially enables more effective communication between FIs with all payment detail changes synced with all parties, including corporates. This is particularly beneficial to managing exceptional scenarios such as sanction hits, wrong remittance details and minimise delays. In addition, it makes international trade faster and simpler because it reduces the workload of FIs' client service teams and improves client payment experience.

2. Conditions of payment

One primary risk facing corporates in international trade is failure of receiving goods upon payment. Wholesale CBDCs, in the long run, could mitigate this risk by leveraging the programmability nature of digital currency, whereby a payment only settles between FIs if certain conditions are met.

There are two potential benefits to both FIs and corporates. Firstly, importers could mitigate the performance and delivery risk of exporters by leveraging the payment conditions of electronic central bank money. This also benefits exporters as importers may be more willing to improve payment terms with a lower counterparty risk.

Secondly, FIs are able to leverage the programmability of electronic money to have a better control of clients' trade finance usage, e.g. restricting specific beneficiaries of certain trade finance or enable trade finance to be disbursed to tiered supplier throughout the supply chain. With a better monitoring in usage of trade finance, FIs are able to offer cheaper trade finance to corporates in the long run. We shall explore the potentials in more detail in the next section.

3. Cheaper and faster trade settlement

mBridge is able to reduce international payment fees by minimising number of financial intermediaries involved. With CBDC, crossborder payment involves transferring an electronic central bank money from initiating FI to the beneficiary FI without passing any intermediaries as required in correspondent banking model. In addition to cutting intermediary fees, mBridge also removes the delays experienced due to public holiday or time zone difference with the intermediaries, enabling trade payments that are cheaper and faster.

2.5 Future use cases for CBDC-based programmable money

In addition to facilitate a more transparent, cheaper and faster trade payment, CBDC is also designed to facilitate payment on performance of parties. By leveraging its programmability design nature, CBDC potentially is an excellent tool to transform and digitise many trade instruments. Below are some illustrative potential use cases for Programmable CBDC:

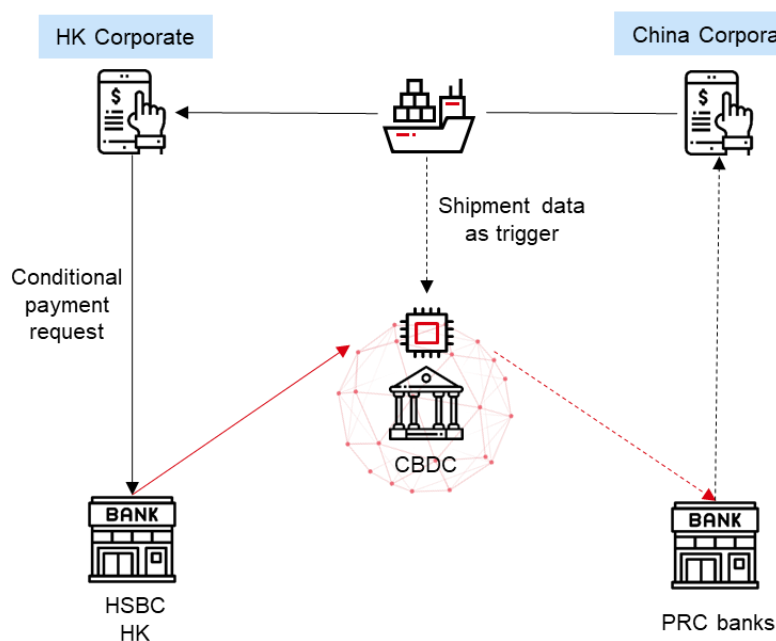
- **Trade Loans:** FIs may disburse trade loans in the form of programmable CBDCs that restrict corporates' usage of funding (i.e. comes with specific conditions on the timing of payment, beneficiary or expenses to be settled).

With a more secured control of fund use, CBDC would help mitigate risk faced by FIs in credit lending more efficiently, removing the need for corporates to submit supporting trade documents to FIs in loan applications. In addition, FIs may consider expanding their appetite in lending, granting more corporates access to trade financing.

- **Guarantee:** Programmable money as a security to be transferred to a beneficiary where the money is programmed to only be able to spend if certain conditions are met (i.e. non-performance of obligations or tender).
- **Financing deeper in the supply chain:** With programmable CBDC, FIs potentially are able to provide a more comprehensive financing to the entire supply chain by making it possible to transfer the commitment to pay down the supply chain to deeper tiers or by linking payment commitments between various tiers. This can support MSMEs working capital needs by enabling them to rely on bigger buyers' credit standing to get better financing.
- **New forms of risk mitigation:** Using programmable features of CBDC, an additional layer of risk mitigation could be added to the trade transactions by making payment conditional with key milestones or confirmation from third parties (e.g. carrier, surveyor, ports,).

Above are only some potential use cases to transform trade instruments using conditionality of CBDCs. We are keen to explore more crossborder applications with the mBridge project.

Example of a CBDC-enable payment condition



Use Case 3

Wealth Management Connect Settlement

3.1 Introduction

The Cross-boundary Wealth Management Connect (WMC) Scheme in the Guangdong-Hong Kong-Macao Greater Bay Area (“GBA”) is one of the key initiatives under the mutual market access schemes that will impact the capital markets of the three jurisdictions. The scheme was launched in September 2021, allowing eligible residents in selected GBA cities to invest in wealth management products distributed by banks in each other’s market through a closed-loop funds flow channel established between their respective banking systems.

This section examines how settlement via CBDC over the mBridge may provide opportunities to encourage

new product development and optimise crossborder digital asset settlement under a scheme such as WMC. It could assist with the management of complex operations and compliance requirements, including the management of transfer quota, product eligibility and close circuit arrangements.

3.2 Proof-of-concept Overview

To explore the benefits of a wholesale CBDC-based WMC settlement via mBridge, HSBC aims to simulate Delivery versus Payment (DVP) settlement of WMC. This will allow the exploration of end-to-end digital assets value chain from origination, digitisation, and issuance to DLT-native atomic DVP settlement via wholesale CBDC.

3.3 PoC solution components & features for exploration

1) PoC Digital Asset Network

- ◆ Incorporate e-HKD as a settlement currency
- ◆ Exchange of eHKD–eCNY with Eligible Wealth Assets and New Investment Vehicles
- ◆ Manage WMC product eligibility
- ◆ Manage WMC close circuit rules
- ◆ Manage WMC banking transactions
- ◆ Tokenisation & Programmable Money

2) Exploration of Programmable Money / Programmable Assets Features

- ◆ Customer Profile Check
- ◆ Time Period
- ◆ Asset Class

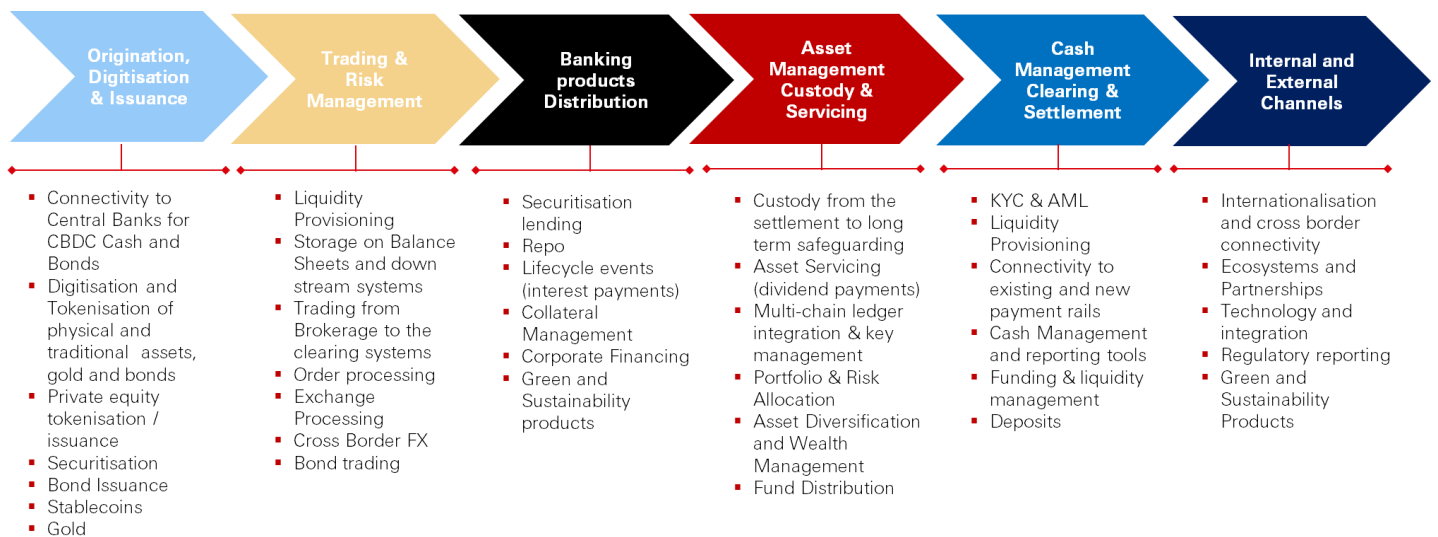
- ◆ Region Identification

3) Potential Tokenise New Investment Vehicles for PoC

- ◆ Green Bonds
- ◆ Private Equity / Venture Capital
- ◆ Property / Real Estate
- ◆ Sustainability: ESG / SDG UN

3.4 Digital Asset Value Chain

Below is an illustration of the end-to-end value chain of digitised / tokenised assets. DLT-enabled tokenisation of many asset classes and wholesale CBDC deployed as a DvP settlement mechanism shall encourage new product development, simplify distribution, reduce risks, and strengthen compliance.



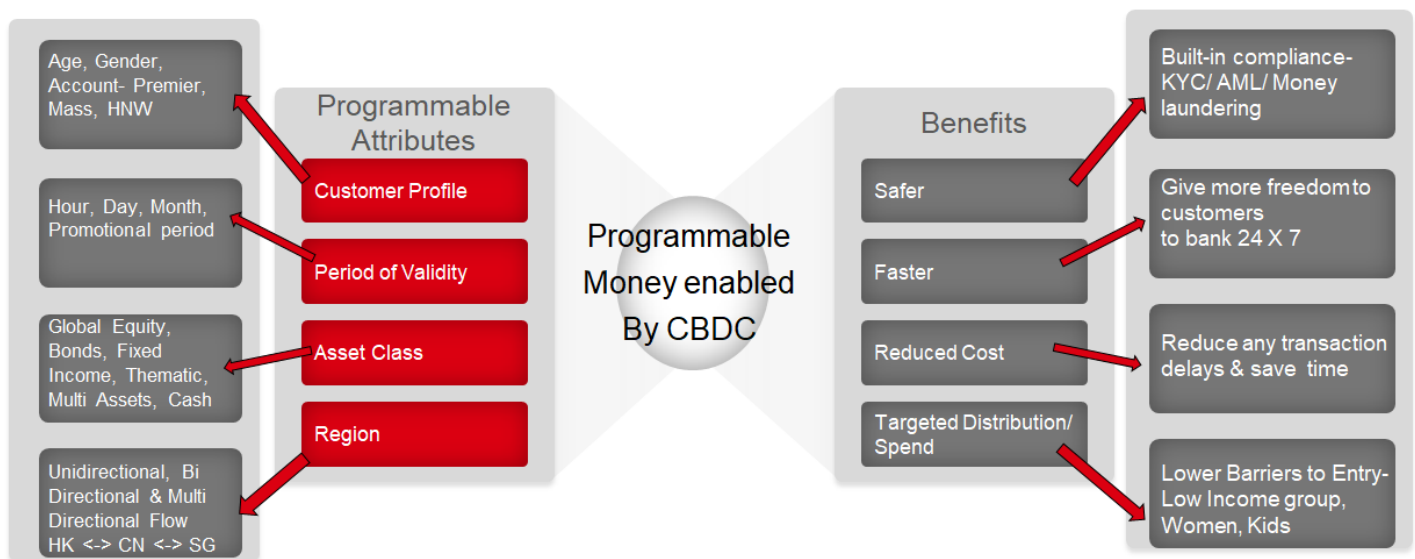
3.5 Further use cases for CBDC-based Programmable Money

Further to using mBridge to explore streamlined crossborder settlement of the transactions in the Wealth Management Connect scheme, we are also keen to explore additional Programmable Money applications as an extension for this PoC. Below are some illustrative potential use cases for Programmable Money:

- ◆ **ESG:** Programmed money as a birthday gift to a teenager where the money is programmed to be spent only on ESG investments thus encouraging the teenager to create a habit of investing in sustainability.
- ◆ **Charity Tokens:** Citizen can buy charity tokens that are programmed to be donated with recognised charities with immutable proof for tax deduction and other reporting purposes.

- ◆ **Community Aid:** Government issues targeted aid currency. For example, Hong Kong Covid-19 small business vouchers which are programmed to be eligible for cross-boundary use in GBA area.
- ◆ **Foreign / Regional Investment scheme:** A citizen from a foreign jurisdiction could use programmable money tokens to invest in local stock without needing to open an on-shore investment or bank account with the token limited to be invested into authorised asset classes on the local market.

While some of these programmable money use cases may still operate without the mBridge on a domestic basis, the availability of a crossborder settlement service would greatly enhance the scope and applicability of these use cases.



Conceptual diagram of CBDC-backed programmable money

3.6 Expected benefits to customers

mBridge platform enables the exploration to streamline settlement process of crossborder / cross-boundary settlement of Wealth Management Connect transactions. Wide adoption of CBDC would also be a

catalyst for additional investment products and new tokenised assets to be made available for investors. Further to the settlement process, the programmable nature of CBDC may further encourage use cases in ESG, charity, community aid, and broader crossborder investment schemes.

Disclaimer

This document is issued by The Hongkong and Shanghai Banking Corporation Limited, Hong Kong ("HSBC").

HSBC does not warrant that the contents of this document are accurate, sufficient or relevant for the recipient's purposes and HSBC gives no undertaking and is under no obligation to provide the recipient with access to any additional information or to update all or any part of the contents of this document or to correct any inaccuracies in it which may become apparent. Receipt of this document in whole or in part shall not constitute an offer, invitation or inducement to contract. The recipient is solely responsible for making its own independent appraisal of the products, services and other content referred to in this document. This document should be read in its entirety and should not be photocopied, reproduced, distributed or disclosed in whole or in part to any other person without the prior written consent of the relevant HSBC group member.

Copyright: HSBC Group 2021. ALL RIGHTS RESERVED.