e-HKD Pilot Programme: Tokenised Deposits

High-Level Summary

As part of Hong Kong Monetary Authority's (HKMA) e-HKD Pilot Programme, **Visa** alongside **HSBC** and **Hang Seng Bank** has successfully completed the pilot for tokenised deposits use cases. In a global first, Visa collaborated with two leading banks in Hong Kong to explore the atomicity and interoperability of on-us and cross-chain payments across two key interbank B2B payment flows using tokenised deposits settled over wholesale CBDC (wCBDC).

Tokenised Deposits is a developing area relating to tokenisation, generally referring to the digital representation of bank deposits where money deposited with a bank is minted on that institution's own blockchain ledger with the backing of that financial institution's balance sheet. The two interbank payment flows which were tested in this pilot – property payments and acquirer-merchant settlement – were tailored to deliver a range of potential benefits focused on the Hong Kong market.

1. **Property Payments:** In the Property Payments use case, a high-value payment process utilises tokenised deposits as the payment mechanism between customers of different banks for a property purchase. A tokenised deposit solution would provide bank customers greater end-to-end integration and easier reconciliation of their own ledgers for high-value, time-sensitive payments.

2. **Acquirer-Merchant Settlement:** In the Acquirer-to-Merchant Settlement use case, tokenised bank deposits could be used for transacting payments in the settlement process between an acquirer and their merchants. The acquirer is usually a financial institution that processes credit and debit card transactions for a merchant. After a customer's transaction has completed, the acquirer initiates the settlement process to their merchants. This pilot presents a novel approach to B2B payments – offering transparency, improving liquidity management, and enhancing current last mile payment processes.

Other Scenarios: Addressing internal bank money movement, the pilot further showcases the usefulness of tokenised deposits in corporate treasury management for both multi-national banks and multi-branch corporates that may need to move liquidity near real time between branches or operational accounts.

To test an intrabank B2B payment use case of tokenised deposits, the exploration focused on supplier payments. This approach seeks to streamline the accounts payable process, bolster payment transparency, and improve cash flow. These enhancements have the potential to complement traditional banking processes, introducing greater efficiency and security in B2B transactions.

Proposed potential Benefits of Using e-HKD (tokenised deposits over a wholesale CBDC layer)

- **Reduction in Settlement Risk:** In the tokenised deposits pilot through interaction with smart contracts, Visa was able to achieve end-to-end atomic settlement for payment processes with its pilot platform. This means that participating banks in the process can credit payment recipients in near real time with lower settlement risk. It also helps improve liquidity availability due to the reduction in collaterals and end-to-end settlement time.

- **High-Value, Time-Sensitive Payments:** Current payment intermediary configurations can be restricted with transaction limits that make them unsuitable for large B2B payments. Tokenised deposits could address this issue with high transaction limits that are possible due to reduced settlement risk, while retaining the speed of real time payment systems.

- **Transparency:** Users can monitor the status of a transaction in near real time by looking at the block status for any pending transaction. In addition, currently all transaction data is stored as part of an immutable blockchain-based ledger helping to prevent a bank employee from being able to falsify transaction history.

- **Programmability:** Banks can take advantage of the programmable nature of smart contracts offered by an e-HKD and tokenised deposits to digitise and even automate established financial practices by embedding existing and new business logic directly into blockchain environments. Numerous opportunities for automation of processes using programmability were noted during our pilot using real-life use cases.

Key Findings and Learnings

- **Settlement Finality:** Measure of time to final settlement and availability of funds for the high-value interbank B2B payment processes using realistic bank payment scenarios: The time to final settlement for an interbank transfer, as confirmed through our pilot's testing between the banks, was near real time. Tokenised deposits were burned on the sending bank's ledger, minted on the receiving bank's ledger, and simultaneously settled interbank via the simulated wholesale CBDC layer. This would provide for settlement in an atomic manner with better streamlining of any operational dependencies imposed by financial institutions and other intermediaries, thus improving liquidity management.

- **Designed to be a Global Always-on Infrastructure:** Measure of availability/uptime of tokenisation payment services: During the pilot, the Visa platform offered banks a network availability that was available after hours and during the weekends through a platform designed to be "always-on" 24/7/365 infrastructure. Our testing was completed using blockchain networks that were available globally and supported by teams in other time zones, including time slots that would be after hours for traditional payment systems.

- **Privacy of Transactions:** The testing conducted with banks demonstrated how all on-chain transactions can remain encrypted by reviewing on-chain transactions using block explorers: These tests demonstrated that tokenised deposits can be fully transacted while remaining encrypted, without revealing information about identity, balances, or transaction amounts to non-bank users. This setup can allow for full transparency and auditing to be achieved on transactions by using zero-knowledge proofs, while not revealing any private information on customers.

Next Steps

In the coming years, tokenisation presents a significant industry opportunity with untapped potential. Visa plans to continue investing in exploring different use cases across all our regions, with an anticipated focus on three key areas:

1. **Tokenised Asset Markets and Programmable Finance:** As the market for tokenised assets expands in the coming years, especially within the capital markets, there will be a growing need to have payment rails that can offer atomic payments for Delivery vs Payment (DvP) use cases using smart contracts. Tokenised deposit schemes, coupled with central bank settlement technologies, can help lead the market in terms of liquidity for tokenised assets. Visa is currently exploring DvP processes using tokenised deposits in other pilots globally and expects to work on similar pilots directly with additional partners. Smart contracts also offer automation capabilities that can improve upon current finance practices. For example, in this pilot's "Property Payments" use case, the payment from a buyer transferring the remaining balance tokens to the property developer may be automated upon reaching the completion date of the contract, minimising lag time in closure of the process. We plan on providing additional automation for finance processes beyond this pilot through further testing with our banking partners.

2. **Expansion of Retail Solutions:** Expansion to retail users for tokenised deposits will allow our banking partners to build differentiated products and experiences in this space. For markets that do not have a Real Time Payment (RTP) system, a DLT-based system can deliver faster payments and settlement across P2P, C2B, and B2B use cases with improved efficiency and resiliency. Such a system that enables the creation of tokenised deposits, CBDCs, or stablecoins can help strengthen a market's global competitiveness, bringing faster payment and settlement.

3. **Digital Cross-Border Payments:** Tokenisation of deposits has the potential to achieve fully digital cross-border payments and bring efficiencies to these payments. Traditional correspondent banking networks can take up to two days to complete settlement and be subject to expensive fees for users. In addition, correspondent banking can be expensive for banks, with the cost for maintaining nostro accounts among global banks amounting to approximately $1.5B annually[1]. With tokenisation, cross-border payments could become faster and cheaper, enabling remittances, cross-border goods purchases, trade finance processes as well as improve the efficiency of current correspondent banking processes. Visa is focused on helping build tokenised deposits into fully functioning payment schemes by driving standards for interoperability, privacy, and compliance and will be working with partners to test and refine these schemes to enable smoother cross-border payments.

[1] Challenges and innovations in cross-border payments | A Visa white paper (foleon.com)