mBridge Use Case:

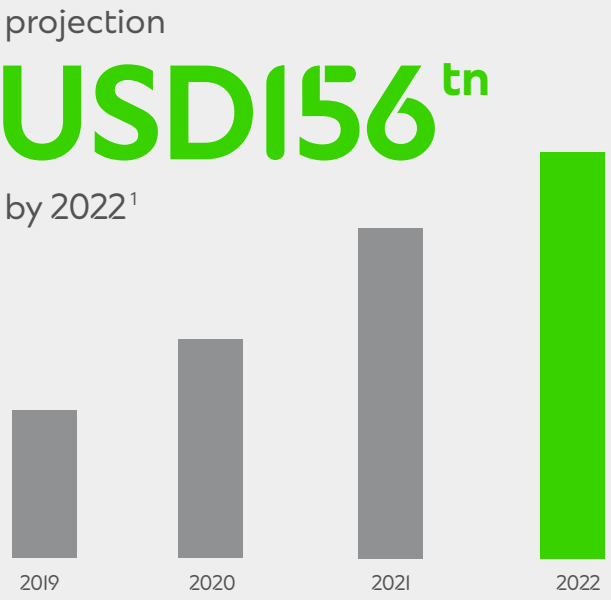
Low Value Aggregation Service (LOVAS)

Introduction

In recent years, the volume of global cross-border payments has been increasing – primarily due to factors such as globalisation, e-commerce and a growing middle class. This growth is expected to continue, eventually reaching USD156tn by 2022[1].

While the large value cross-border payment market segment is well-covered by banks via the SWIFT-based correspondent banking network, the emerging low value cross-border payment segment – which is currently the fastest growing segment in this market – is presently under-served by banks.

Businesses and consumers need more convenient, open, and with mCBDC Bridge (mBridge), banks are able to better serve their needs and be more financially inclusive.



mBridge and LOVAS

mBridge has already shown that it has the potential to resolve many of the pain points that are commonly associated with the existing correspondent banking model for large value cross-border payments.

Our aim is to extend mBridge to the low value cross-border payment segment – and this is where the Low Value Aggregation Service (LOVAS) comes in.

LOVAS is designed as a blockchain network that can provide a low value[2] payments aggregation service to participating banks for their commercial C2C, B2B, and B2C[3] flows. LOVAS works by integrating existing domestic instant payment schemes with mBridge – this enables multilateral clearing of low value cross-border payments.

Simply put, low value cross-border payments can be cleared instantly, efficiently (via multi-lateral netting) and safely without the issues often seen in the correspondent banking model. This is the goal of our experiment with mBridge and LOVAS.

[1] How new entrants are redefining cross-border payments – EY, Feb 2021
[2] Low value payments, generally refer to those with transacted amounts lesser than USD1m or its equivalent, but may be also be specifically defined in each payment scheme.
[3] C2C (consumer-to-consumer), B2B (business-to-business), B2C (business-to-consumer)

Challenges+

While digitalisation has led to many improvements in payment processes, there are still numerous challenges with low value cross-border payments – especially inefficiencies in liquidity, FX, settlements and operations.

Key issues: Inefficient liquidity and FX costs

For example, in cross-border payments, the liquidity costs from funding nostro accounts can make up to 35%[4] of the total cost.

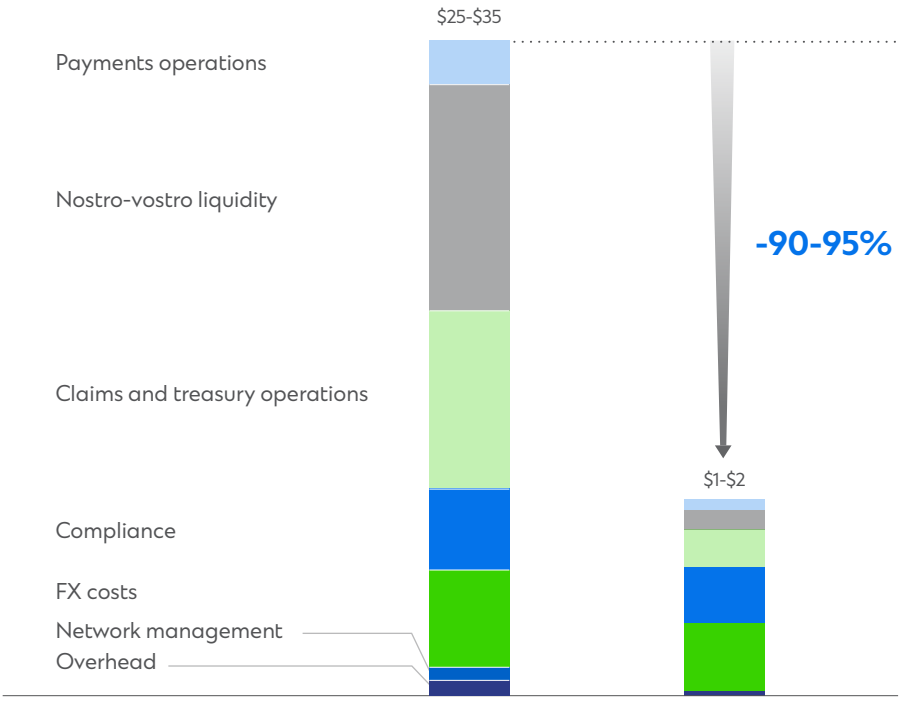
Furthermore, this cost applies to even new payment aggregator services (such as Wise and Remitly) and is due to the legal requirement for any foreign bank (or payment service provider) to have a nostro account with a domestic clearing bank, before they can access the currency.

To process global payments, banks and payment service providers must maintain multiple nostro accounts with various banks across the globe – just so they can access different currencies. Each of these accounts is funded separately, resulting in inefficient liquidity.

Additionally, when funds cross borders via correspondent banks, currency conversions take place – and these add high FX costs to transactions – up to 15%[4] of the total cost.

These liquidity and FX-driven costs are part of all cross-border payments. New payment services may divide these costs, so they appear to cost less per transaction – but these costs are still there, and limit any further possible savings.

Cost per international payments transaction



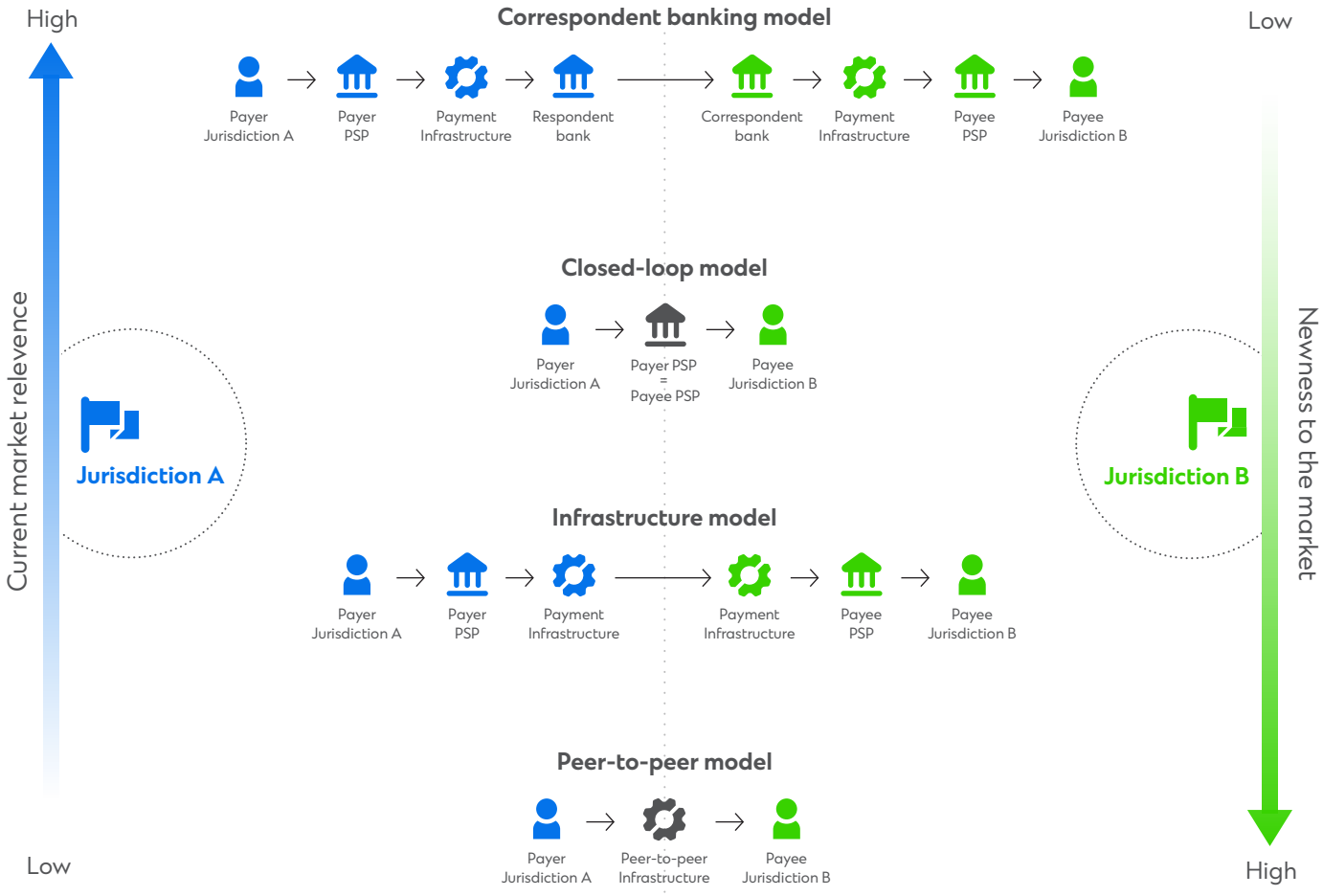
Source: McKinsey Global Payments Map

[4] A vision for the future of cross-border payments – SWIFT and McKinsey & Co., Oct 2018

Liquidity traps in new payment services

While these (and other related) issues are not new, new payment services also bring another layer of issues – especially as most are operated as closed-loops[5] that only allow payments between their own users, within their own ecosystems. This compels businesses and consumers to join multiple platforms.

Similar to funding nostro accounts, consumers and businesses too need to pre-fund these platforms. For businesses, this means having cash and working capital tied up with different platforms. New multi-payment access services (such as Stripe) try to address this situation by consolidating different payment options, but this flexibility comes with additional costs.



⟶ The arrows represent the movement of funds and messages containing instructions about the payment flow in both directions.

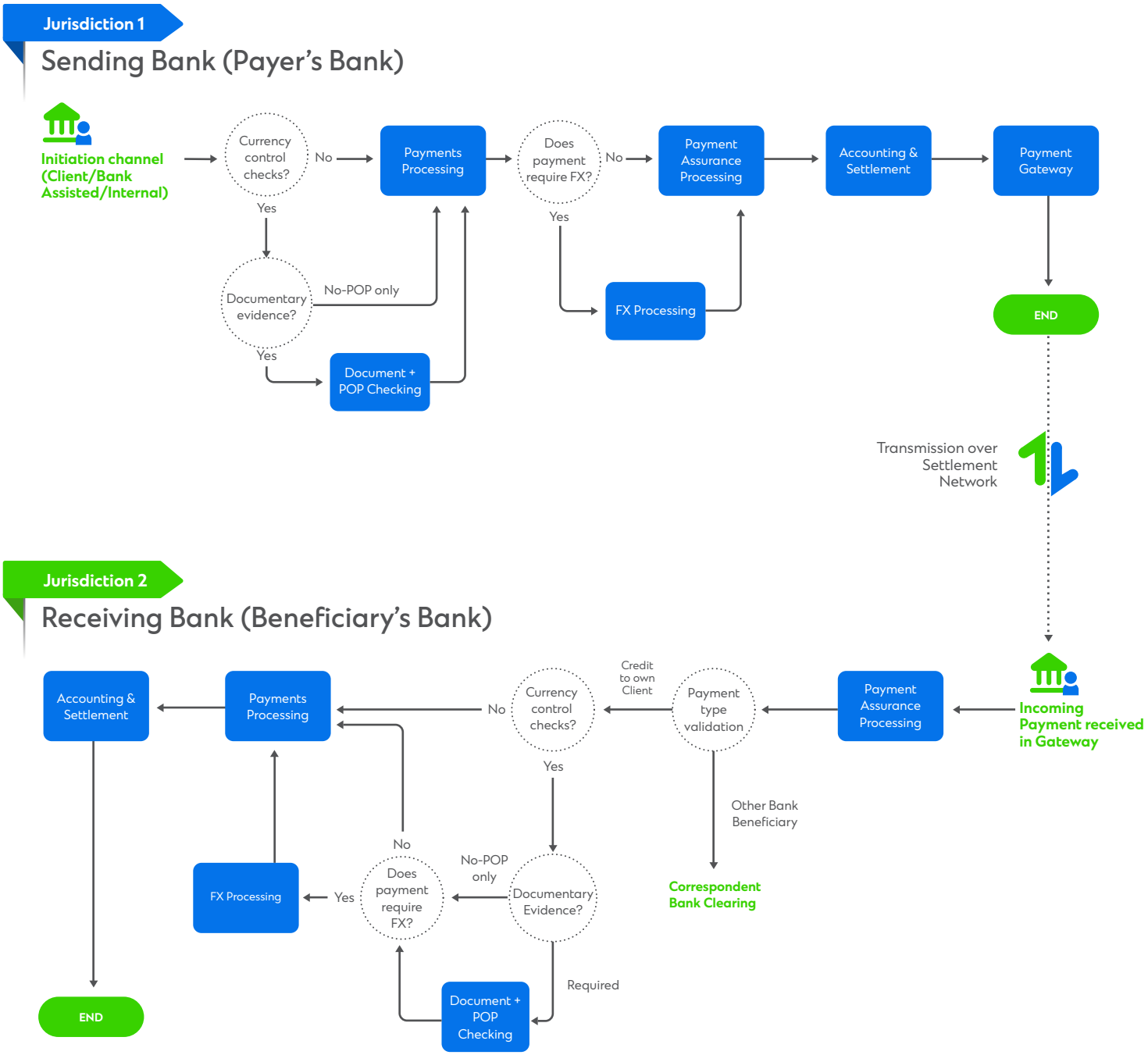
Source: CPMI (2018)

[5] Closed-loop payment platforms are those requiring pre-payment/pre-funding before a user makes a payment directed to another user on the platform. Hence, the value carried and transmitted by the payment flows never exits the platform.

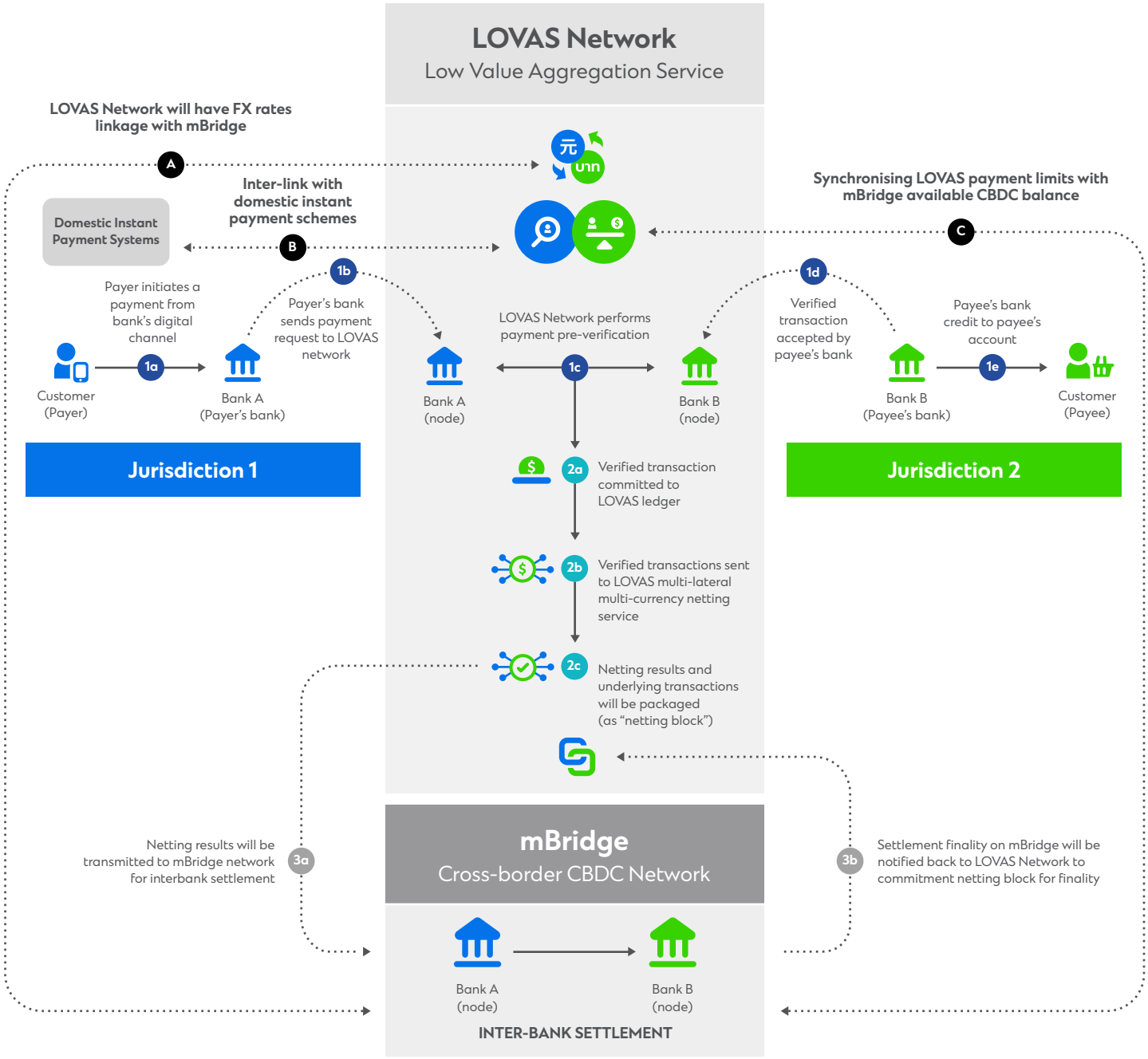
Settlement and operational inefficiencies

Settlement and operational inefficiencies – such as slow settlements, high failure rates, and replication of settlement processes across banks and intermediaries – are longstanding challenges in cross-border payments.

For low value payments, there are additional complications from combining large numbers of transactions – only to split, re-attribute and reconcile them later. Also, as traditional international payments are not pre-validated, settlement failure rates are higher – leading to further issues and inefficiencies.



LOVAS Network Transaction Flow



A

LOVAS Network interlink with mBridge for FX rates, leveraging on FX modes – Broad rate and RFQ – to fulfil rates on customer payments

B

LOVAS Network interlink with various domestic instant payment systems to leverage on the addressing for pre-validation

C

LOVAS Network interlink with mBridge for CBDC balances to impose clearing limits to improve settlement certainty

Instant payment via bank guaranteed finality

- **1a** Bank's customer will initiate payment via bank app or internet banking, with any FX determined upfront via FX interlink with mBridge's FX
- **1b** Bank will perform necessary internal validation (e.g. of customer's available balance) and send as a validated payment request to LOVAS Network
- **1c** Validate payment request will be pre-verified on LOVAS Network for limit availability and payee details (via domestic instant payment schemes)
- **1d** Validated payment request will be accepted by payee's bank
- **1e** Payee's bank will apply payment and credit payee's account

LOVAS netting

- **2a** Verified payment requests will be signed by the sending bank, LOVAS Network, and receiving bank, and committed as a LOVAS transaction on the ledger
- **2b** LOVAS transactions will be accumulated until a netting cycle is started. A netting cycle may be started (1) by one or more participant banks proposes one when their internal payment criteria are reached, or (2) based on LOVAS liquidity saving mechanism
- **2c** Netting results which is a set of bilateral payments that will extinguish the mutual payment obligations amongst the participants with respect to the set of underlying transactions will be computed by LOVAS, and packaged a netting block

LOVAS x mBridge settlement

- **3a** Netting results will be transmitted via API from each bank's LOVAS node to its mBridge node so as to initiate mBridge payments
- **3b** Status of mBridge payments completion will be notified from each bank's mBridge node to LOVAS node to validate the netting block and commitment it to the blockchain for LOVAS finality

Enabled by technology, delivered via network +

This brings us to the purpose of our experiment with mBridge and the LOVAS Network.

Our goal is to eliminate these inefficiencies, and it's possible because the LOVAS Network extends the mBridge and its benefits to cross-border low value payments, while also providing improvements through its unique capabilities like netting, limit management and instant finality.

How it works: Improving operational efficiency with shared and programmatic transaction processing

Generally, cross-border and low value natures add many complications to standard payment processing. What's more, large volumes of payments require complex aggregation and re-attribution – while cross-border payments require complex routing to correctly direct payments to their intended recipients.

With mBridge and LOVAS, everything changes.

Using a shared transaction ledger on blockchain, payments will be transparently recorded on LOVAS – with all the processing steps automated using smart contracts. Additionally, the technical mechanisms in "blocking" and "chaining" also offer a natural format that simplifies aggregation and re-attribution without significant effort on reconciliation at each participant bank.

The result? LOVAS streamlines processing, while also reducing operational costs and risks for everyone.

Improving settlement certainty with in-built pre-validation

A key part of the LOVAS design is incorporating transaction pre-validations for cross-border low value payments.

Currently, pre-validation is only performed for domestic low value payments, such as those operating on instant payment schemes – but not for cross-border low value payments. This leads to high failure rates.

Moving forward, LOVAS includes a pre-validation service that can be integrated with various domestic instant payment infrastructures – enabling cross-border pre-validation of beneficiary details using existing addressing methods, as well as an option to have verification done directly by the beneficiary's bank.

The pre-validation service will also synchronise limits with mBridge using APIs, which will enable banks to conduct real-time checks for sufficient balances on mBridge – ensuring settlement risk-free payment finality.

Enhancing liquidity efficiency with netting mechanism

The question remains – why is there a need for a change, especially when new payment services are already enabling customers to complete instant global payments?

The answer lies in beneath the surface, as underlying liquidity flows remain entrenched in the nostro-based architecture of correspondent banking. This means cross-border payments – even when made using new payment services – continues to be liquidity-intensive and inefficient.

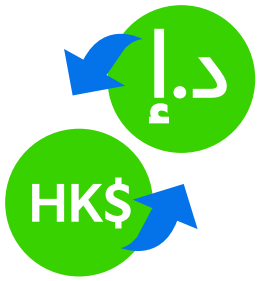
mBridge improves the liquidity efficiency for the wholesale segment by displacing the nostro-based architecture with a direct, point-to-point solution. By integrating with mBridge, LOVAS effectively extends the same efficiency gains to low-value payments – further enhancing liquidity efficiency with a proprietary multilateral multi-currency netting mechanism.

This allows LOVAS participants to achieve their mutual aggregated payment obligations – minimising the gross liquidity needed to settle on mBridge.

Benefits+

LOVAS is designed to address the structural challenges faced by banks, payment service providers, businesses and consumers, while enhancing the entire payment ecosystem by integrating domestic instant payment schemes with the real-time cross-border payment rail, mBridge.

These are the key benefits end-users can expect to see.



Elimination of structural costs

With LOVAS, the benefits of mBridge – specifically improved liquidity, real-time FX, settlement efficiencies, and risk elimination – can be applied to high velocity, lower value payments – the ones that we are seeing more of today within the supply chains of the new economy.

This will reduce the existing structural issues discussed earlier, namely liquidity inefficiencies and FX costs, throughout the entire value chain – benefitting both businesses and consumers.

A safe and open instant payment ecosystem for public interest

Designed as industry shared utility that is integrated with critical payment infrastructures (such as instant payment schemes and mBridge) LOVAS provides a truly open alternative to existing closed-loop payment services.

The LOVAS ecosystem will also provide businesses and consumers the added protection of settling with government-issued CBDCs in contrast to privately controlled money, as well as a matured regulatory regime that governs existing banks.

Better support for business innovation

With LOVAS enabling open, C2C, B2C, and B2B commercial, high velocity, cross-border instant payments, cross-border instant payments, businesses can leverage on this new payment mode to innovate, optimise and adopt new processes.

For example, small businesses dealing with imports and exports (i.e., international trade) are typically exposed to non-payment risks. By leveraging on LOVAS-enabled, instant cross-border payments, these businesses can significantly mitigate these risks.

For further information and interest, you may contact the Standard Chartered Digital Assets Centre-of-Excellence (DigitalAssetsCoE@sc.com) and the Transaction Banking (tb.payments@sc.com) teams, or the authors below:

Shirish Wadivkar
Global Head, Payments
shirish.wadivkar@sc.com

Vinoy Kumar
Global Head, Digital Assets
vinoy.kumar@sc.com

Weikai Phang
Executive Director, Digital Assets (Infra)
weikai.phang@sc.com