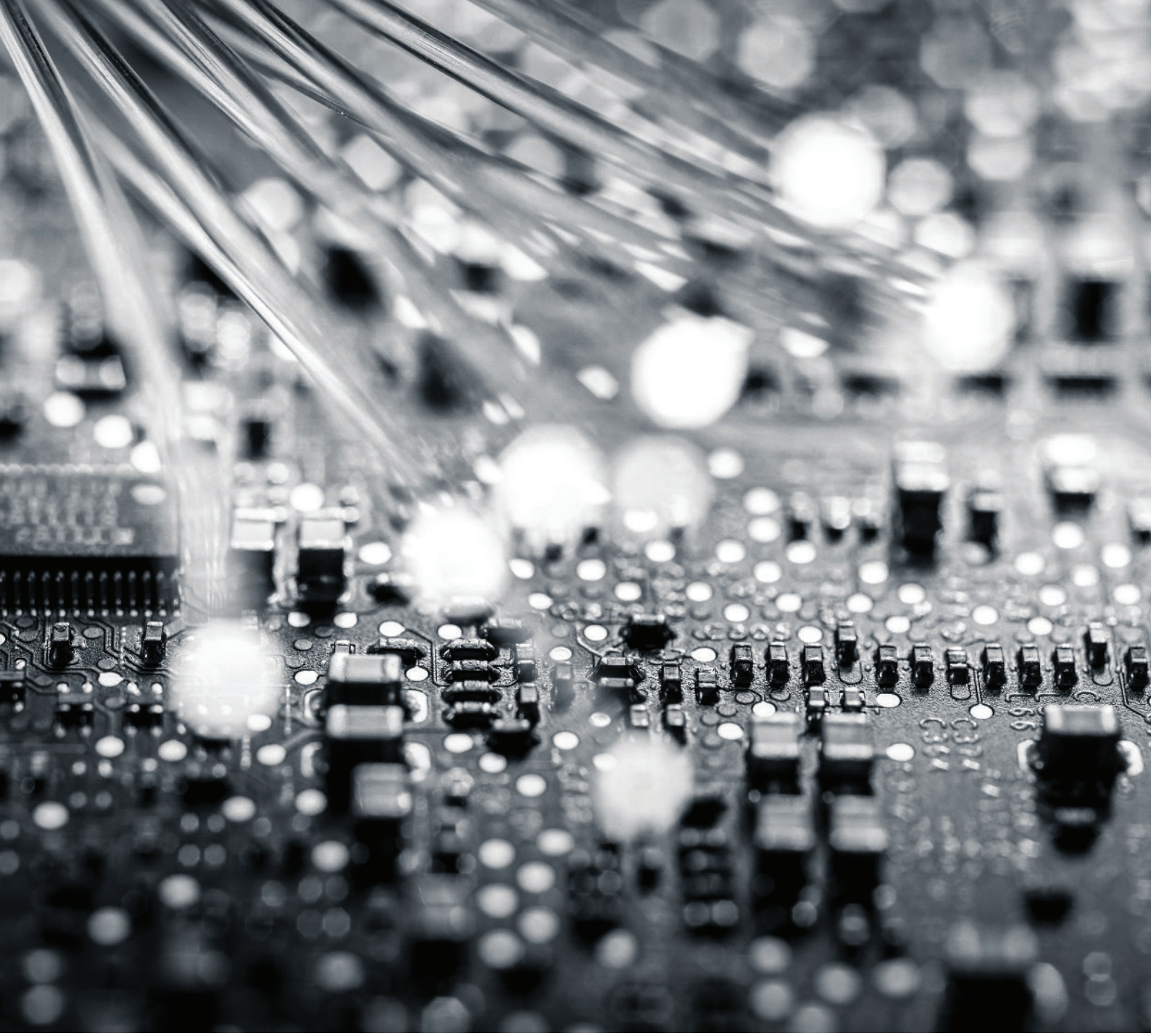
# DISTRIBUTED LEDGER TECHNOLOGY AND OPPORTUNITIES IN CORRESPONDENT BANKING

A PROOF OF CONCEPT PAPER BY ANZ & WELLS FARGO
09.2016

WELLS FARGO

ANZ



EVERY DAY, PAYMENT DISRUPTORS AND COMPETITORS ACROSS THE GLOBE ARE REMINDING BANKS THAT THE CROSS-BORDER PAYMENT INDUSTRY IS RIPE FOR REJUVENATION, PROMISING FASTER AND LOWER COST ALTERNATIVES TO THE CURRENT INTERNATIONAL PAYMENT PROCESS. CUSTOMERS ARE EXPECTING MORE, AND BANKS ARE INVESTING TO MEET AND EXCEED THOSE EXPECTATIONS.

## INTRODUCTION

Correspondent banking has evolved over the past 35 years, from automating telex processes amongst multiple correspondent banks, to a model where fewer, deeper correspondent relationships deliver increased efficiency, speed, standardisation, and compliance of international payments. Despite these improvements, correspondent banking still relies on the need to maintain and reconcile two separately held versions of the account statement (i.e. the Nostro account holder maintains their own mirror ledger). A number of challenges ensue, including:

- poor payment transparency, for both banks and customers;
- onerous reconciliation activities and investigations;
- delays in advising of fund disbursement; and
- inefficiencies in management and usage of liquidity and funding.

These challenges could be largely addressed if the industry were to trust a single record of account that could be shared and maintained by multiple correspondent banks.

Blockchains or distributed ledger technologies ("DLTs") offer a novel solution to the requirement to maintain a single source of truth that is jointly owned by all participants in the system. When combined with process standardisation and improvement, this technology has the potential to increase the speed of cross-border payment finality, whilst also providing increased auditability and preserving the confidentiality of transaction flows.


### What is Correspondent Banking?

To facilitate cross-border payments, banks maintain Correspondent Relationships with foreign banks in order to access their local payment systems.

In each relationship, a bank opens a local currency account (known as a Nostro account) with a foreign bank. When a customer requests a cross-border payment, their bank sends an instruction to the foreign bank to pay the recipient from the local currency Nostro account.

Every sending bank maintains their own record of payment activity for their Nostro accounts at other banks. This record must then be reconciled with the statement provided by the foreign bank at the end of each day.

## BUSINESS USE CASE: DLT FOR NOSTRO RECONCILIATION

In March 2016, ANZ and Wells Fargo entered into an agreement to prove that DLTs could be used to improve the current Nostro reconciliation and settlement process in the dimensions of time, effort and liquidity.

### Our Approach

To demonstrate real business outcomes in a short timeframe and with minimal investment, scope was limited to MT103 and MT2xx transaction types — the vast majority of transactions in normal operations. Integration with existing systems was also limited. Instead, focus was placed on demonstrating that the technology, when paired with an appropriate data model, could provide a complete and multilateral solution given sufficient time and resources.

Given both ANZ and Wells Fargo's membership with the Linux Foundation, the Hyperledger fabric was selected as the technology of choice.

### The Current Nostro Reconciliation Process

Within the current Nostro reconciliation and settlement process, the need to maintain and reconcile separately held ledgers covering the same events is a source of chronic inefficiency for global banks.

As part of this process, the SWIFT network is used to send and receive information regarding the transfer of funds between financial institutions to facilitate correspondent banking relationships. On average, over 26 million messages are exchanged over SWIFT each day.[1] Each institution keeps a separate record of transactions applied to the statement account. These are mostly reconciled through an end-of-day batch process, which has flow on implications for time, effort and liquidity.

### Challenge 1: Poor Payment Transparency

The end-of-day batch reconciliation process can result in a 24 to 48 hour delay in visibility of transaction status. While each bank in the payment chain is aware of its own action, a complete overview of a payment's status is not available until it has fully traversed the chain, and any associated investigations are closed. Additionally, fees and charges applied throughout the payment chain are not always disclosed to all parties. This lack of transparency between the banks involved translates into a lack of transparency for the sending and beneficiary customers on either end of the payment.

In our proof of concept, a distributed ledger network of financial institutions was established to record and reliably share the information needed to execute a cross-border payment, without the need for centralised infrastructure. As a result, all participants within a given payment chain can see the creation and completion of a payment in real time.[2]

This transparency carries some immediate benefits, including the ability to:

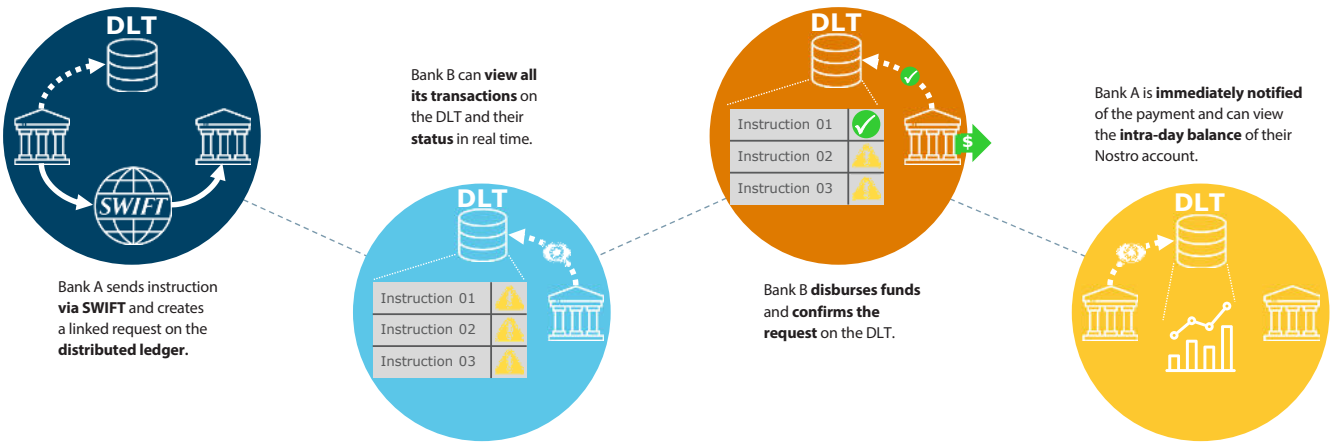
- immediately confirm that settlement by the beneficiary's bank has occurred; and
- identify and investigate delayed or problematic payments more quickly.

While valuable, this greater sharing of information poses challenges to traditional approaches to enterprise security — approaches that often involve securing the perimeter of an enclosed data set, while allowing access once "within the walls".

Permissioned distributed ledgers differ in this regard by securing individual data packets rather than just the perimeter. By leveraging cryptographic techniques such as public / private keys, DLTs are able to facilitate information sharing while limiting access to only the relevant parties.

When coupled with the requisite business process changes, this increased transparency could reduce payment investigation times and provide a base for improving downstream inefficiencies of the payment process, without sacrificing the security or confidentiality of transactions.

FIGURE 1:
**Proof Of Concept Infographic**




[1] https://www.swift.com.
[2] See diagram above for process details.

**Challenge 2:**
**Onerous Reconciliation Activities and Investigations**

Current financial reporting frameworks operate on a double entry accounting model, requiring financial institutions on either end of a transaction to keep their own record of that transaction. The standard for this in correspondent banking is the use of Nostro accounting, whereby the account holder keeps a mirror ledger of their Nostro account held with another bank.

The maintenance of these separate records, coupled with the delays associated with an end-of-day batch process, give rise to the need for each bank to retrospectively reconcile their separate views of the same events. While this often involves a high degree of automation, a significant amount of manual effort results from the percentage of payments that cannot be automated.

In our proof of concept implementation, request records were created on the distributed ledger each time a remitting bank sent an instruction via SWIFT. These records were later confirmed at the point the receiving bank disbursed the funds from the remitting bank's Nostro account. By recording these events in a distributed ledger, and doing so in real time on a "per transaction" basis, links were created between the actions of each bank in the payment chain. This shared view eliminates the need to manually reconcile "unmatched" transactions that traditionally resulted from either a lack of transparency or the impact of time zone differences on batch processing.

It is important to note that investigations would still be required in some cases, for example, where initiated transactions have not settled within an acceptable period of time. However, the volume, and therefore cost and effort associated with payment investigations, could be significantly reduced.

**Challenge 3:**
**Delays in Advising of Fund Disbursement**

While actual settlement of interbank transactions is generally very quick — often occurring within seconds — the sharing of that knowledge is delayed by a combination of end-of-day batch processing and time zone differences. As a result, parties to a transaction may be unaware of the settlement for 24 hours or more after it has occurred, often leading to downstream delays to enrichment of the end beneficiary.

By enabling banks in the payment chain to maintain a record of their actions at the point of occurrence, the distributed ledger provides a means of ascertaining the state of a payment at any given point in time.

Looking ahead, if financial institutions could alter their legal and operational frameworks, and trust the distributed ledger record as an indication that obligations have been met and funds are irrevocable as the settlement occurs, beneficiary banks would then be able to speed up funding to customer accounts, from over 24 hours to within seconds.

**Challenge 4:**
**Inefficiencies in Management and Usage of Liquidity and Funding**

Currently, a financial institution derives their funding position with a correspondent bank using a mirror ledger of their Nostro account. This balance is indicative, as it only reflects the actions of the remitting bank, and reflects a scenario where all inward and outward transactions settle on a given day. Direct account credits and debits to the correspondent Nostro account are also unaccounted for. These discrepancies between the expected position and actual position lead to a situation where banks must make funding decisions based on estimations rather than fact.

In our implementation, the ability to ascertain the state of a payment at any given point in time provides a basis for optimising Nostro account balances. By providing a real time view of payments — both completed and pending — financial institutions are able to understand the true balance of their Nostro account, and use this information to fund their accounts more accurately. Excess funds that would otherwise be "locked in" to a Nostro account could be deployed elsewhere, either to fund other accounts or activities, or placed in the market for a return.

This opens the door for financial institutions to shift from a liquidity management model that focuses on funding individual payments, to one that focuses on overall management of float on a bilateral or multilateral basis.

Increased transparency enables financial institutions to manage and optimise their own liquidity, and most importantly, pass information and funds to their customers within significantly faster timeframes — in many cases, immediately.

## DRIVING INDUSTRY-WIDE ADOPTION

The collaboration between Wells Fargo and ANZ resulted in the creation of a shared distributed ledger platform that could operate in parallel with existing business processes and infrastructure.

By storing information on a distributed ledger, we were able provide the ultimate solution for interbank transparency. With this information, participating banks could:

- ascertain the intra-day balance of their Nostro accounts;
- view the status of inward and outward transactions; and
- calculate the correspondent fees accrued for each transaction.

These capabilities offer the potential to eliminate the need for manual reconciliation, significantly reduce the requirement for lengthy investigations, accelerate confirmation of interbank settlement, and optimise access to liquidity.

These benefits could also support an improved customer value proposition, including status tracking of transactions, better fee visibility, and faster payment dispute resolution.

While our proof of concept tested these capabilities on a bilateral basis, significant potential was observed, should this be extended to the broader industry. Given the nature of distributed ledgers as a network technology, we recognise the need to drive industry-wide adoption in order to fully realise its benefits. While the technology is several years away from mainstream adoption, we have identified a number of industry activities that could drive industry adoption forward.

### Distributed Ledgers and Financial Services

While there has been significant hype around blockchain and DLT, the financial industry has taken a more conservative approach to understanding the features that make the technology suitable for enterprise-grade use. A public, pseudonymous network, like the one implemented for Bitcoin, is not suitable for a regulated network of large scale financial institutions.

Variances, however, of Bitcoin's underlying technology, such as permissioned DLTs, can deliver the benefits of reliable information sharing, while reducing the need for intermediaries and their associated costs, and do so with a high degree of security through cryptography. These features are of real interest to banks, and it is therefore no surprise that the financial industry has begun to explore the technology in earnest.

In early 2016, ANZ and Wells Fargo became founding members of the Linux Foundation's Hyperledger Project, which aims to collaboratively build an enterprise-grade, open standard for blockchain technology. As at September 2016, the Project has over 80 contributing members. Other industry consortiums such as R3CEV and Chain have also gained momentum, with a narrower focus on applying distributed ledger technology to financial services. Several banks have also conducted small-scale trials of distributed ledger technologies such as Ripple and Ethereum, and use cases have been tested in the areas of Trade Finance, Securities, Identity and Payments. While distributed ledgers are still in their infancy, the actions and contributions by financial institutions signal a clear recognition of the potential benefits of this technology.

### Innovation in the Global Payments Industry

The emergence of new technologies and competitive disruptors to global payments infrastructure has begun to shift the industry to a more customer-centric model[3]. Customers are expecting more, and banks and their partners are investing to meet and exceed those expectations.

The global payments industry, along with SWIFT, has recognised the opportunity to up its game. On 10 December 2015, SWIFT announced a "global payments innovation initiative to dramatically improve the customer experience in correspondent banking by increasing the speed, transparency and predictability of cross-border payments".[4] The initiative is based on the premise that correspondent banking can be rejuvenated with a set of multilateral service level agreements that drive process change to the benefit of the end customer, while still operating on SWIFT's existing secure and resilient global platform. The outcomes of these process changes will mean customers have same day use of funds, transparency and predictability of fees, end-to-end payments tracking and richer payment information.

SWIFT's global payments innovation initiative (SWIFT gpi) is demonstrating that significant end-customer improvements are possible, even without the introduction of new technologies. However, improvements on existing rails are likely to introduce costs and inefficiencies for banking operations in the longer term. Therefore, sustainable improvements will likely come from consideration of new or alternative technologies.

SWIFT gpi has committed to driving such fundamental change. While the role of an intermediary is reduced with the use of DLT, there is still a requirement for a central body of governance. Decisions regarding treatment, application and enhancements of the network need to be managed. In the financial services industry, regulatory compliance and reporting requirements must still be met, and the journey of transformation must consider custodians of the financial system who are obligated to scrutinise such changes in the interests of integrity and prudence. SWIFT's incumbent role in the industry means that it is well placed to facilitate decision-making and stakeholder engagement. This, combined with the progressing process changes initiated through GPI, has the potential to yield a truly innovative approach to cross-border payments and correspondent banking.

[3] SWIFT White Paper, www.swift.com/resources/documents/SWIFT_white_paper_correspondent_banking.pdf.
[4] SWIFT press release, 10 Dec 2015.

## CONCLUSION

Cross-border payments and correspondent banking are ripe for rejuvenation. Disruptors and competitors across the globe are reminding banks of this daily. Blockchain and distributed ledger technologies have the demonstrated potential to support innovation and assist in revolutionising the industry. Our proof of concept has demonstrated that DLTs have the potential to add real value to both the customer experience and the efficiency of correspondent banking.

However, business process innovation is still required. Technology innovation must be combined with process improvement, and ultimately, a focus on the end customer in order to yield valuable results.

THE GLOBAL BANKING INDUSTRY HAS A RARE OPPORTUNITY TO TRANSFORM ITSELF THROUGH COLLABORATIVE INNOVATION OF BOTH CORE INFRASTRUCTURE AND PROCESS. THESE ARE INDEED EXCITING TIMES.

WELLS FARGO

ANZ