BANK OF ENGLAND

FinTech Accelerator Proof of Concept

Ripple - exploring the synchronised settlement of payments using the Interledger Protocol

Background

The Bank of England's FinTech Accelerator works with innovative firms and new technologies. In this Proof of Concept (PoC), we wanted to explore the synchronised movement of two different currencies in two different *simulated* Real Time Gross Settlement (RTGS) systems using the Interledger Protocol.

The Bank has also recently started a programme of work to replace the UK's Real Time Gross Settlement (RTGS) service. RTGS is where financial institutions hold their sterling bank accounts. Like any account holder, these institutions can store balances ("reserves") in these accounts, or use them to make payments. The Bank of England has been operating RTGS since 1996 to provide a safe and immediate way for banks to exchange payments. Since 2006, it has been paying interest on reserves held in RTGS, to support the implementation of monetary policy as set by the Monetary Policy Committee. The vision for the renewed service is set out in the RTGS blueprint[1] document published in May 2017. In that vision, the Bank explained that it planned to introduce new functionality to support the 'synchronisation' of cash movements made in RTGS with the movement of cash and assets held in other systems in the next generation of RTGS. More detailed analysis of the benefits and costs of the different technical options was however required. This PoC formed part of that analytical process. It should be noted that the Bank's PoC process is completely segregated from core systems, does not use any core system code, and uses a simulated RTGS system to explore the features we are interested in.

The Proof of Concept

This PoC focused on a high-value cross border payment scenario in which transactions in two different currencies are executed simultaneously in two different simulated RTGS systems that could represent two different countries. Our key objectives were:

- Determining whether the Interledger protocol could provide a suitable technical solution to the scenario;

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[1] http://www.bankofengland.co.uk/markets/Documents/paymentsystem/rtgsblueprint.pdf

- Exploring situations in which the synchronised settlement process should not complete (for example, where there is a lack of available liquidity to make a payment) and to understand potential ways of responding; and
- Building understanding of the technical challenges associated with both synchronisation and the Interledger Protocol.

The Ripple solution utilised by the Bank was built around the open source Interledger Protocol that enables payments to be made across different ledgers and networks across the world. A ledger is essentially a file used to record transactions measured in terms of a monetary unit of account. The solution used Ripple Connect, which acted as the interface that enables an institution's internal systems to integrate with the Ripple network. This means that payment instructions can be sent and received, and the state of payments can be queried. The solution also utilized the ILP Validator network which coordinates the settlement of payments between the transacting ledgers, and is the source of truth regarding the success or failure of such payments.

We successfully integrated the Ripple solution with two simulated RTGS systems, hosted in the cloud, and demonstrated that we could process a successful cross-border payment across two RTGS systems simultaneously. We also demonstrated that an attempted cross-border payment that failed validation on the receiving side would not be honoured.

Reflections and next steps

This PoC was a useful exercise to develop the Bank's understanding of synchronisation and possible technical solutions. Our key learning points were:
- That the Interledger Protocol was able to support synchronisation of payments between two simulated RTGS ledgers;
- That the ILP Validator created a single source of truth between the two ledgers, eliminating the need for separate processes such as mutual reconciliation between separate ledgers;
- Cross-border payments when applied to wholesale markets present different challenges than when compared with retail and corporate transactions, which the Ripple product is designed to handle. The availability of liquidity is one such challenge, and the PoC allowed the Bank and Ripple to begin exploring these questions.

The Bank is considering further Proofs of Concepts to extend its understanding of the dimensions of the synchronisation concept.