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Cross-Border Payments

The critical path of modernizing a multi-trillion-dollar market

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Content

Cross-Border Payments, April 2024

Cross-border payments are vital for economic development by enabling international trade and finance. Traditionally, entities providing payment services maintained a broad network of correspondent banking relations. This network, however, contracted significantly over the past decade. Increasing costs, lack of transparency, and limited speed seem to be the main drivers for market participants to look for alternatives to the established correspondent banking model. Simultaneously, new market initiatives emerge, and innovative technologies allow for smart solutions. In this paper, we present three market solutions and discuss why more modern approaches offer the potential for a faster, more cost-efficient, and transparent cross-border payment market but require concerted effort from public and private stakeholders to gain further market traction. Despite the challenges, payment service providers should monitor activities in the payments sector closely to benefit from new developments.

01. Introduction

In a cross-border payment, the payer and payee, and typically financial institutions holding their assets, are in different countries. The involvement of different regulatory frameworks, intermediaries, payment infrastructures, operating hours, and currency conversions make cross-border payments relatively high-cost, low-speed, limited-access, and non-transparent.[1]

Nonetheless, there is a growing global demand for cross-border payments with transaction volumes rising.[2] In 2023, it reached over USD 190 trillion and it is expected that the volume will surpass the mark of USD 290 trillion by 2030.[3] Despite the demand, institutions retreat[4] from the correspondent banking landscape, i.e., the prevailing foundation for cross-border payments.

Given the growing importance of efficient cross-border payments for international trade and global development, the G20[5] endorsed a roadmap for improving the underlying processes. The roadmap, worked out by the Financial Stability Board (FSB), the Committee on Payments and Market Infrastructures (CPMI), and other standard-setting bodies, tackles several focus areas that need to be addressed to enhance cross-border payments. Two focus areas cover payment infrastructure and arrangements, i.e., the workings behind cross-border payments.

In this paper, we zoom in on payment infrastructure and arrangements. First, we compare the mechanics behind a well-established model (correspondent banking) and two alternative approaches (closed-loop and interlinking model). Then, with SWIFT gpi, Ripple Payments and NEXUS, we present market solutions for each model and discuss possible reasons why new approaches will lead to a more cost-efficient and transparent cross-border payment market, but still face challenges in the market.

1 CPMI (2020)

2 Bank of England (2023)

3 FXC Intelligence (no date)

4 Rice et al (2020) and CPMI (2022)

5 Intergovernmental forum comprising 19 countries and the European Union.

02. Cross-Border Payment Models

We assume throughout this paper that payment service providers (PSPs) have direct access to the domestic instant payment system (IPS) infrastructure. This allows PSPs to act as payment initiator (with the consent of the payer) of the domestic and cross-border payment without the requirement for the payer to hold and pre-fund an account with the PSP.

2.1 Correspondent Banking Model

The traditional and well-known operating model for cross-border payments taps into correspondent banking arrangements, where the correspondent bank provides banking services to the respondent bank in exchange for a fee. One of these services is the administration of nostro accounts in foreign currency through which financial institutions can process cross-border payments. Typically, cross-border wholesale payments today are processed through a chain of correspondent banks.

Figure 1 shows the parties involved when a payer residing in the eurozone transfers funds to a payee in the United States. To generalize, the payer's and payee's payment service providers (PSP) do not have a correspondent banking arrangement. They rely on the services of Bank A (respondent) and Bank B (correspondent).

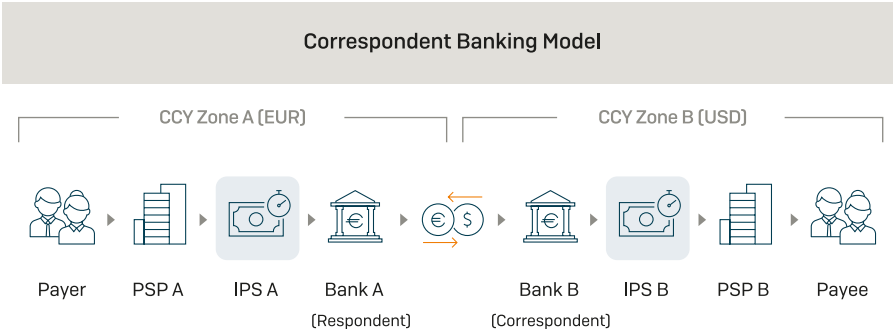

Figure 1: Cross-border payment in a correspondent banking model

Bank B holds a USD-denominated nostro account for Bank A. This account is the bridge between currency-specific domestic IPSs, e.g., TIPS for EUR and FedNow for USD. After the payer initiates the transaction, PSP A sends funds in EUR to Bank A through IPS A. Bank A then instructs Bank B to send funds in USD to PSP B. To do so, Bank B debits Bank A's nostro account.[9] After receiving the funds from Bank B through IPS B, PSP B credits the payee's account.

To complete a cross-border payment, many institutions need to cooperate. They must set up arrangements in advance and ensure pre-funding of accounts. Also,

6 An instant payment system (IPS) provides a payment infrastructure to processes payments between accounts held at banks and/or payment service providers (PSPs) instantly or within seconds and ultimately settles those payments (either in central bank or commercial bank money). They can operate in a single-currency (domestic) or multi-currency (global).

7 TARGET instant payment settlement (TIPS) is a service launched by the Eurosystem in November 2018 to support settling of payment transfers in EUR.

8 FedNow was a service launched in July 2023 to support settlement of domestic payments in USD.

9 At this stage, Bank B has a claim against Correspondent Bank A. One option to settle the claim is to credit Bank B's EUR account held by Bank A, if such an account exists.

communication paths can be lengthy. Finally, the settlement between the correspondent banks in commercial bank money bears risks. These issues can make the process slow, error-prone, fail at multiple stages, and non-transparent.

2.2 Interlinking Model

The interlinking model connects domestic instant payment systems (IPSs) of two or more countries without the need for correspondent arrangements.[10] This simplifies cross-border payments for payment service providers (PSPs) that lack a presence or partnership in a specific market. Figure 2 shows the communication chain and parties involved.

The interlinking model has some significant advantages: it does not rely on correspondent arrangements and re-utilizes existing IPS infrastructure as well as bank's associated services and their relationship with bank account holders, including the AML/KYC process. Still, establishing compatibility across IPSs remains a challenge. The number of country-to-country links grows quadratically with the number of network participants. This results in many different data formats and schemes.[11,12] Currently, not even a hand full of IPS are linked. Thus, a highly scalable approach is needed to create a global network of IPSs offering cross-border payments.

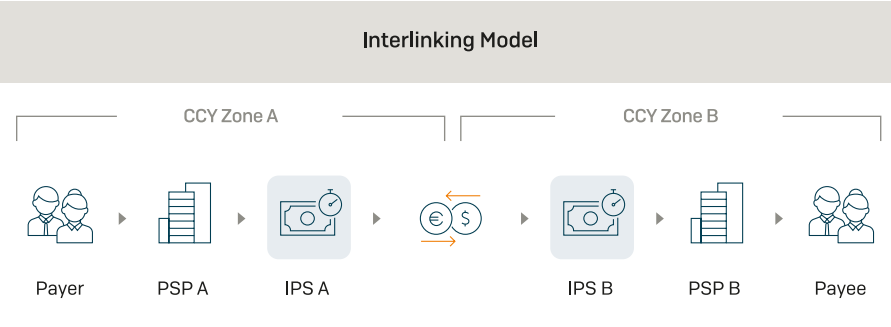

Figure 2: Cross-border payment in an interlinking model

2.3 Closed-Loop Model

In the closed-loop model, the payment service providers (PSPs) of both the payer and payee are the same entity or at least part of the same organization. As shown in Figure 3, this could be a multinational financial institution that operates in two currency zones by bridging them through a single, in-house instant payment system (IPS). Typically, cross-border retail payments rely on closed-loop systems.

Enabled by new technologies, the number of closed-loop systems grows continuously[13] while the model draws its advantages from simplicity: there are few entities involved; there are no correspondent arrangements and pre-funding in the destination market, e.g., through nostro accounts, needed; and transactions are fast.

10 According to BIS Innovation Hub (2021), instant payment systems are operational in around 60 countries on a 24/7 basis, allowing for cross-border payments within seconds in an interlinking model.

11 EPC (2023a) sets rules, practices, and standards to achieve cross-border instant payments in SEPA (OCT Inst scheme).

12 BIS Innovation Hub (2023)

13 CPMI (2018)

But this model also bears risks. A lack of supervisory oversight, for instance, might lead to an inconsistent and potentially insufficient approach to risk management. Also, market inefficiencies are a potential issue, i.e., fragmentation, if closed-loop systems are non-interoperable, and dominance, if only a few closed-loop systems prevail.

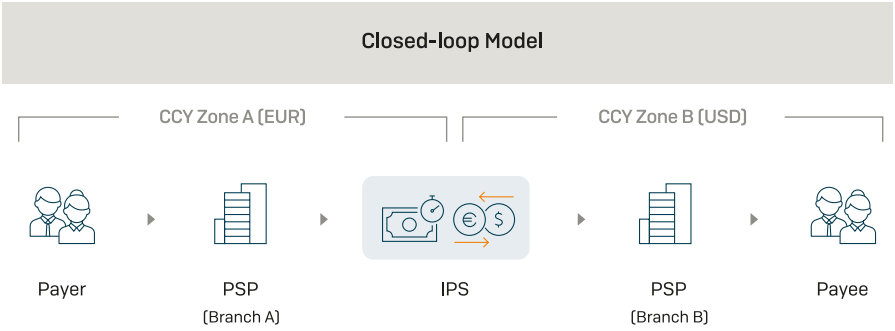

Figure 3: Cross-border payment in a closed-loop model

03. Market Solutions for Cross-Border Payment Models

This section opens with Table 1 that summarizes how the three market solutions for cross-border payments compare across relevant features. Then, subsections follow that cover the solutions in detail.

Feature	SWIFT gpi	Ripple	NEXUS
Market penetration	High	Low	Not yet available
Pre-funding	Yes	No	No
Speed	9 hours on average[14]	Near real-time	30-60 seconds
Cost transparency	Ex-post	Ex-ante	Ex-ante
Certainty	Transaction can fail at multiple stages	Transaction completes or fails within seconds	Transaction completes or fails within seconds
Access	VPN or leased line with ISO20022	REST API with ISO20022	REST API with ISO20022

Table 1: Comparison of market solutions

14 Average payment processing time 9 hours, while the median is only 2 hours (CPMI, 2022). Speed is higher in special cases, like payments from the UK to the US, where 72% of the gpi payments are processed within 30 minutes (SWIFT, 2020).

3.1 Correspondent Banking Model: SWIFT GPI

The correspondent banking model relies on exchanging payment messages via SWIFTNet. In 2017, SWIFT introduced SWIFT global payments innovation (SWIFT gpi) as a messaging and processing standard to address certain pain points of cross-border payments without changing the underlying correspondent banking arrangements.

SWIFT gpi's goals are improving payment traceability, speed, and cost transparency. Unique identifiers assigned to every payment (Unique End-To-End Transaction Reference, UETR) and higher standards for participating institutions enable the first two goals. Cost transparency, however, is still an open point, and there is no roadmap for how to get there with SWIFT gpi.[15]

3.2 Interlinking Model: Nexus

NEXUS is an initiative led by the Bank of International Settlement (BIS) to leverage existing IPSs for cross-border payments. NEXUS aims to overcome the complexity of linking IPSs by providing a standardized way for domestic payment systems to communicate. The following elements are essential for reaching this goal:

1 NEXUS Scheme defines the rules and obligations for IPSs and PSPs who make cross-border payments through NEXUS ("NEXUS payments"). It aims at supplementing domestic single-currency IPS schemes with the minimum number of changes required to enable cross-border payments.

2 NEXUS Gateway is a software component hosted by the domestic IPS through which PSPs can communicate using REST API. Each gateway coordinates processes, such as compliance, pre-validation, FX conversion[16], message translation, and the sequencing of payments between two countries.

By adhering to this standard, any IPS, and its members, can directly connect with existing NEXUS IPSs as soon as it joins the NEXUS network. Hence, this approach is significantly less complex and more cost-effective than connecting to multiple IPSs separately.

3.3 Closed-Loop Model: Ripple Payments

Ripple is a private instant payment system (IPS) provider specialized in cross-border payments, which promotes i.a. closed-loop model and interlinking model objectives.[17] Ripple's IPS (Ripple Payments)[18] is designed to directly connect financial institutions, banks, and payment service providers (PSPs).[19] In addition, the underlying neutral Interledger Protocol[20] allows for bridging different domestic IPS infrastructures.

15 According to question "3. What checks does Payment Pre-validation perform?" upfront fee information is not available yet (SWIFT, no date).

16 According to BIS Innovation Hub (2021), FX Providers are required to establish a connection to the NEXUS network to quote rates at which they are willing to swap one currency for another.

17 Bank of England (2017) successfully tested the integration of Ripple's IPS with two IPSs.

18 Ripple rebranded RippleNet to Ripple Payments in November 2023 (Ripple, 2023a).

19 IPS members can connect to the Ripple Payments via REST API.

20 Interledger Protocol is an open-source blockchain protocol aiming to remove intermediaries to create a secure, decentralized cross-border payment network.

In Ripple Payments' On-Demand Liquidity (ODL) service, XRP[21] tokens are at the core of cross-border payments. However, customers of Ripple's fiat-based network can use the ODL service without the need to hold XRP. Parties on either side of the transaction will still send and receive funds in their respective fiat currencies, but the actual value transfer is done via the XRP ledger.

The underlying payment process is as follows:

1 When a payer initiates a payment, both PSPs exchange information about the payer and payee for KYC/AML checks and sanctions screening.[22]

2 If checks pass, Ripple's service calculates the fee and exchange rate of the transaction.

3 The payer accepts or declines the fund transfer at the predetermined rate.

4 If accepted, the send side Digital Asset Exchange (DAE A) debits the account and converts the local currency to XRP.

5 XRP is then sent across the XRP ledger from the send side to the receive side (DAE B).

6 DAE B converts XRP into local currency and credits the payee's account.

Figure 4 summarizes the parties involved in a cross-border payment via Ripple Payments. Here, PSP A and PSP B could either relate to the same entity or to two different institutions.

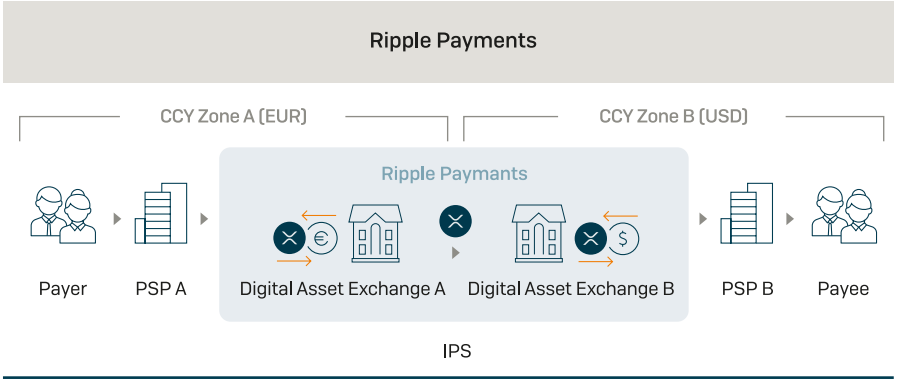

Figure 4: Cross-border payment through Ripple Payments

Before the originator accepts the fund transfer, Ripple Payments queries digital asset exchanges for exchange rates and fees enabling ex-ante cost transparency.[23] Add-on fees, e.g., charged by intermediaries involved in the correspondent banking model, do not exist.

21 XRP is a digital currency that operates on a decentralized, public blockchain also known as XRP ledger using a Federated Consensus Mechanism, which differs from traditional methods such as Proof-of-Work or Proof-of-Stake.

22 According to Ripple (2016) the underlying setup is entirely configurable.

23Ripple Payments leverages existing liquidity hubs, in the form of digital asset exchanges, which take on the market maker's role for fiat-to-fiat currency conversion putting XRP in the middle.

In essence, Ripple Payments' underlying distributed ledger technology claims to offer cross-border payments that have a higher data security, are faster, more transparent, and cheaper than traditional approaches, such as correspondent banking.[24] As of Nov 2023, Ripple claims to have payout coverage spanning over 70 payout markets through Ripple's international payments network.[25]

04. Discussion

Market conditions for new cross-border payment solutions to succeed are currently very favorable. Novel approaches, in particular interlinking models, seem to gain market traction while the established correspondent banking model begins to struggle.[26]

Furthermore, solution-specific aspects, as shown for Ripple Payments and NEXUS, highlight how new approaches accelerate access and allow PSPs to build microservices to enable instant, low-cost, and transparent cross-border payments.

New cross-border payment solutions, however, are very likely to face difficulties in gaining wider market acceptance. Security concerns and lack of trust are particularly relevant issues that impede adoption rates. The uncertainty surrounding regulatory and supervisory responses to innovative solutions further complicates the decision-making process for market participants.[27] In addition, interlinking domestic instant payment systems will depend on technical assistance and funding to develop and further extend the global network.

Therefore, it is crucial, for industry representatives and authorities alike, to accompany such market solutions with clear regulatory guidelines for interoperability, funding strategy, and industry partnerships to tip the balance further towards new cross-border payment solutions.

d-fine, with its proven track record in systems integration projects and its expertise in banking operations, can support transitions to modern payment infrastructures. Our consulting services for operations address your strategic, professional, and technical needs in connecting the core bank to state-of-the-art payment systems. In a broader sense, we cover the digitization of your bank, where payment transactions are an essential building block in reaching this goal.

24 Ripple (2016) states that OAuth is being used for authentication and authorization. And the underlying data model is aligned with ISO 20022 standard for financial messages.

25 Ripple (2023b)

26 Transaction volumes for cross-border payments are projected to increase significantly while Rice et al (2020) and CPMI (2022) show that financial institutions retreat from the correspondent banking landscape. In addition, EPC (2023b) highlights that industry professionals see a major growth in adoption for interlinking models like NEXUS and EPC's OCT Inst scheme.

27 WEF (2023)

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Authors

Julius-Benjamin Hey
Manager and Expert for Payments & Settlement
d-fine GmbH, Frankfurt
Julius-Benjamin.Hey@d-fine.com

Dr Thomas Gorniak
Senior Manager and Expert for Securities Processing & Payments
d-fine GmbH, Munich
Thomas.Gorniak@d-fine.com

Philipp Madauß
Manager and Expert for Banking Transformation & Payments
d-fine GmbH, Dusseldorf
Philipp.Madauss@d-fine.com

Dr Milena Tieves
Manager and Expert for Collateral Management
d-fine GmbH, Dusseldorf
Milena.Tieves@d-fine.com

d-fine

Berlin
d-fine GmbH
Kranzler Eck
Kurfürstendamm 21
10719 Berlin
Germany
berlin@d-fine.de

Dusseldorf
d-fine GmbH
Dreischeibenhaus 1
40211 Dusseldorf
Germany
duesseldorf@d-fine.de

Frankfurt
d-fine GmbH
An der Hauptwache 7
60313 Frankfurt
Germany
frankfurt@d-fine.de

Hamburg
d-fine GmbH
Am Sandtorpark 6
20457 Hamburg
Germany
hamburg@d-fine.de

London
d-fine Ltd
14 Aldermanbury Square
London, EC2V 7HR
United Kingdom
london@d-fine.co.uk

Milan
d-fine s.r.l.
Via Giuseppe Mengoni 4
20121 Milano MI
Italy
milano@d-fine.com

Munich
d-fine GmbH
Bavariafilmplatz 8
82031 Grünwald
Germany
muenchen@d-fine.de

Stockholm
d-fine AB
Brahegatan 10
114 37 Stockholm
Sweden
stockholm@d-fine.se

Utrecht
d-fine BV
Stadsplateau 7
3521 AZ Utrecht
Netherlands
utrecht@d-fine.nl

Vienna
d-fine Austria GmbH
Seilerstätte 13
1010 Vienna
Austria
wien@d-fine.at

Zurich
d-fine AG
Brandschenkestrasse 150
8002 Zurich
Switzerland
zuerich@d-fine.ch