

Cross-Border Faster Payments

EXECUTIVE SUMMARY

There is an ever-increasing need for the payments industry to meet customers' demand for faster, safer, and more secure payments. This is true particularly in the case of cross-border payments, which face more counterparty and currency exchange risk and more rules and forms of governance than their domestic counterparts.

This paper endeavors to address **Use Case and Experience Requirements** for cross-border faster payments, particularly along the **dimensions of Speed, Cost, Ubiquity, Transparency, and Risk**. It is structured to identify **interoperability approaches**, along with associated **settlement schemes** that are necessary to create a world-class cross-border payment system.

Use Cases and Experience Requirements

Different use cases of cross-border payments have different consumer and business users, each with different needs and challenges.

- **Consumer-to-Consumer (C2C)** payments must resolve two critical problems, namely **Speed** and **Cost**, regardless of the payment size.
- **Consumer-to-Business (C2B)** payments must also resolve problems related to **Speed** and **Cost**.
- **Business-to-Business (B2B)** payments have challenges in **Speed**, **Cost**, and **Transparency**.
- **Business-to-Consumer (B2C)** payments have challenges in **Speed**, **Cost**, and **Ubiquity**, while **Transparency** is quickly becoming a greater expectation within this user segment.

The similarities and nuances of these needs require careful consideration when building systems that will deliver faster cross-border payments.

To achieve these goals, faster cross-border payment systems will need to incorporate approaches to interoperability and settlement beyond what exists today.

Interoperability Approaches

Interoperability defines the relationships between participant institutions to allow the necessary cooperation for cross-border payments. The paper outlines three models:

- **Bespoke** - Point-to-point messaging and settlement relationships between institutions that are set up and negotiated on a one-off basis.
- **Centralized** - Hub-and-spoke messaging and settlement relationships arranged between institutions with an intermediary acting the central connecting entity.
- **Hybrid** - A multi-hub system inclusive of intermediaries where a single messaging and settlement relationship allows access to an interconnected network of participants.

The hybrid model has the potential to represent the truest form of interoperability. The key requirements for the hybrid model are cooperation and coordination between payment operators and regulators. By acting together, they can fuse the bespoke and centralized models, and derive additional advantage from available digital technologies that provide stakeholders with a faster, more ubiquitous, and less costly cross-border payment experience.

Settlement Schemes

Settlement options determine the method for the exchange of value between parties. There are three types of settlement possibilities that can be employed across interoperability models, each of which affects the user experience with a trade-off between cost and speed.

- **Real-Time Gross Settlement (RTGS)** - Settlement where each payment is submitted individually and instantly without batching or netting.
- **Deferred Net Settlement** - Settlement where payments are held to a predefined settlement cycle when obligations are calculated and netted against each other prior to settlement.
- **Hybrid Settlement** (A cross between RTGS and Deferred Net Settlement) - Settlement where payments are either submitted instantly or held for programmatically determined settlement cycles for netting prior to settlement.

Interoperability & Settlement Models Fit vis-a-vis User Experience Framework

The underlying interoperability and settlement models of a Faster Payments ecosystem will have direct impact on the end user experience and effectiveness criteria. This mapping indicates with respect to a particular dimension whether a model is directionally positive, directionally neutral, or directionally negative.

DIMENSIONS	Cross-Border Models					
	INTEROPERABILITY			SETTLEMENT		
	Bespoke	Centralized	Hybrid	Real-Time Gross Settlement	Deferred Net Settlement	Hybrid Settlement
Speed	↓	↗	↗	↗	↘	↔
Cost	↓	↗	↗	↖	↗	↔
Ubiquity	↔	↔	↗			
Transparency	↓	↗	↗	↗	↔	↗
Risk	↔	↔	↗	↗	↔	↔

Summary on Delivering a Faster Payments Cross-Border System

As user demands continue to grow, the payments industry must act to meet customers' demands for faster, safer, and more secure payments. Differences in user needs mean there will not be a one-size-fits-all solution. Instead, interoperability between systems is required along with the flexibility to extend support to include hybrid models of moving information and value.

Faster Payments inherently highlight characteristics of speed, cost, ubiquity, transparency and risk in a payment transaction. The way money moves today across borders involves a complex network of pairs of banking partners and equivalent handshakes, making all the required characteristics of faster payments difficult to achieve, but as more countries adopt faster payments, faster cross-border payments are achievable.

Cross-Border Faster Payments

Introduction

As highlighted in the Faster Payments Task Force report titled “The U.S. Path to Faster Payments,” there is an ever-increasing need for the payments industry to meet customers’ demand for faster, safer, and more secure payments.¹

This is true particularly in the case of cross-border payments, which face more counterparty and currency exchange risk and more rules and forms of governance than their domestic counterparts. Cross-border money movement, traditionally relying on correspondent banking relationships, suffers from multiple “hops” before money is delivered to the ultimate receiver. This often makes the payments more costly, slower, and less transparent.

At the same time, two major factors must be addressed as a precondition to creating an environment that is conducive to conducting faster payments across borders. First, business and consumers have reset their expectations on payments – anticipating real-time or near real-time receipt of funds. This requirement is mirrored in their everyday lives across multiple industries. Second, domestic and regional faster payments schemes have proliferated in recent years, with 56 national real-time payments systems live as of 2020 and others in the planning or development phase.²

However, tackling the opportunity to improve the user experience for cross-border payments from the point-of-origination through point-of-receipt presents significant challenges:

- *Support for Fundamental Dimensions Across Use Cases* - The need for cross-border payments spans a variety of use cases serving vastly different needs and incentives. The various participants of these transactions have their own motivations and sensitivities to the fundamental dimensions present in these transactions, namely Speed, Cost, Ubiquity, Transparency and Risk.
- *Respect for Sovereign Requirements* - Cross-border payments are, by nature, multi-jurisdictional or multi-sovereignty transactions. There will be cases where there are dissimilar sovereign requirements for transaction handling that need to be accommodated. One such instance, for example, is the sovereign requirement for a “review window” before the transaction can be completed, which obviates a transaction from being “instantaneous.”

¹ Faster Payments Task Force. (n.d.). *Why Faster Payments?* Retrieved May 3, 2021 from https://fasterpaymentstaskforce.org/payment-landscape/why-faster-payments/#_ftn1

² FIS Global. (2020). *Flavors of Fast 2020*. <https://www.fisglobal.com/flavors-of-fast#get-report>



- *Working with a Complex Ecosystem of Providers* - While there are emerging models that strive to reduce complexity, cross-border transactions have traditionally involved a myriad of multiple intermediaries/respondent banks and accounts, clearing systems, and technology providers – all of whom need to work in tight integration to accomplish an effective faster payment experience for payers and payees.

In light of these challenges, delivering on customer expectations is a daunting undertaking. According to the Bank for International Settlements (BIS), standardization and interoperability are important catalysts in the quest to increase efficiency and realize economies of scale and network effects in cross-border retail payments. Further, according to BIS, although international standards can enhance efficiency and interoperability, their full benefits cannot be reaped if they are interpreted and implemented differently from jurisdiction to jurisdiction.³ As a further point of reference, a recent FPC Glenbrook study ranked Interoperability as the top faster payment cross-border payment issue among financial institutions.⁴

Within this context, this paper is structured to identify interoperability approaches, along with associated settlement schemes, that are necessary to create a world-class cross-border payment system. The approaches endeavor to address use case experience requirements for cross-border faster payments, particularly along the **dimensions of Speed, Cost, Ubiquity, Transparency, and Risk**.

³ Committee on Payments and Market Infrastructures. (2018, February). *Cross-Border Retail Payments*. Bank for International Settlements. <https://www.bis.org/cpmi/publ/d173.pdf>

⁴ Auer, Raphael et al. (2021, March). *Multi-CBDC Arrangements and the Future of Cross-Border Payments*. Bank for International Settlements. <https://www.bis.org/publ/bppdf/bispap115.htm>

User Experience

When considering the various approaches to improve cross-border faster payments, it is very important to understand the user experience. Different use cases of cross-border payments have different consumer and business users, each with different needs. This paper considers their challenges as payers and payees across four segments of use cases, each of which covers a range of payment methods depending on context.

Cross-Border User Case Segments

Segment	Description
Consumer-to-Consumer (C2C)	Remittances or non-commerce payments between one individual and another, and to pay other obligations or to transfer money to oneself or a family member or another person in a different country. This is also known as “P2P” or person-to-person payments.
Consumer-to-Business (C2B)	Commerce payments between an individual and a business, primarily including payments for purchase of goods and services from businesses abroad including the internet (e.g., eCommerce, online marketplaces, tuition, and education payments), payment of bills for services directly to a provider abroad, payments resulting from international tourism or business travel, and one-time payments (e.g., investments). ⁵
Business-to-Business (B2B)	Commercial payments between businesses, such as one involving a manufacturer and wholesaler, a wholesaler and a retailer, or the government and a provider; covering trade payments and the payment of invoices.
Business-to-Consumer (B2C)	Payments between a business or a government and a consumer for the purpose of fulfilling an obligation to a consumer, primarily including payroll, marketplace payments for the sale of goods and services, benefits payments, government benefits to citizens living abroad, and insurance disbursements.

⁵ Financial Stability Board. (2020, April 9). *Enhancing Cross-Border Payments, Page 7, Figure 4*. <https://www.fsb.org/wp-content/uploads/P090420-2.pdf>

The range of payment methods by use case is wide and varied. Consideration was given to not only the most common methods but also those that are emerging and solve current challenges. See Appendix [1] for a list of considered payment methods.

The typical payer and payee payment experience is primarily characterized by five dimensions. These dimensions were defined using a combination of the Faster Payments Effectiveness Criteria⁶ and insights from the Financial Stability Board technical background report on Enhancing Cross-Border Payments.⁷

User Experience Framework

Dimension	Definition
Speed	The time it takes for a payee to receive good funds from a payer initiating a cross-border payment.
Cost	The total cost of sending a cross-border payment for the payer and payee, including transaction fees, account fees, applied foreign exchange (FX) conversion rates and fees, and liquidity cost for prefunding.
Ubiquity	Ability of payer/payee to send/receive payments from any payer/payee consistent with applicable legal restrictions and across multiple use cases and in whatever funding mechanism or distribution channel that is convenient.
Transparency	Availability of advance disclosures related to cost, speed, risk, and payments status related to the payment.
Risk	Having in place the structures, policies, and procedures to instill confidence in cross-border payment processing. This includes, but is not limited to, the following: <ul style="list-style-type: none"> – Security Controls that protect confidential, private, and sensitive data. – Appropriate legal and regulatory protection frameworks for all participants (consumers/individuals, corporates, governments) and procedures that allocate legal and financial responsibility, which also support error resolution for all payment types. – Governance that establishes frameworks and procedures to clarify the rights and obligations of all users, providers, payers, and payees.

⁶ Faster Payments Task Force. (n.d.). *Effectiveness Criteria*. Retrieved May 3, 2021 from <https://fasterpaymentstaskforce.org/meet-the-task-force/effectiveness-criteria/#:~:text=The%20Effectiveness%20Criteria%20identify%20desired,Speed%2C%20Legal%2C%20and%20Governance.&text=The%20Effectiveness%20Criteria%20are%20not,requirements%20for%20faster%20payments%20solutions>

⁷ Financial Stability Board. (2020, April 9). *Enhancing Cross-Border Payments*. <https://www.fsb.org/wp-content/uploads/P090420-2.pdf>



Use Case Experience Requirements

Each use case has specific user needs that are determined by the type of participant as well as the intended outcome of the payment experience. For each of the cross-border user segments, there needs to be an understanding of the unique requirements within the user experience framework. These nuances will help payment service providers to better calibrate their products and services toward delivering more customer delight.

Consumer-to-Consumer (C2C)

The two most critical problems to solve for C2C use cases are **Speed** and **Cost**, regardless of the payment size being a high-value or low-value remittance.^{8 9}

High-value remittances are typically used for any type of payment including invoices or other obligations, whereas low-value remittances typically refer to money sent to a family member or another person in a different country.¹⁰ In both cases, users need to have funds delivered quickly, with minimal to no deductions applied.

Cost

Often with C2C remittances, small amounts are sent frequently, so cost is a major consideration for both the payer and payee. High fees can be prohibitive and potentially divert customers to informal value transfer systems. If deductions from the principal adversely impact the value received, consumers may be forced to search for lower cost alternatives. Aside from prohibitively expensive fees, FX rates can be expensive.

Speed

Speed is vital when providing for family expenses, addressing emergencies, paying obligations, or transferring funds between personal accounts. Delays in receipt can lead to additional fees or penalties, and “in transit” funds also do not earn dividends or interest. Transactions require compliance with regulations, particularly as applicable to OFAC scanning or Regulation E¹¹ requirements introduced by Dodd-Frank¹² that are related to disclosure of rates, fees, and timeframes to protect consumers sending money electronically to foreign

⁸ Faster Payments Task Force. (2016, January 26). *Faster Payments Effectiveness Criteria*. Fed Payments Improvement. <https://fedpaymentsimprovement.org/wp-content/uploads/fptf-payment-criteria.pdf>

⁹ Financial Stability Board. (2020, October 13). *Enhancing Cross-Border Payments: Stage 3 roadmap*. <https://www.fsb.org/2020/10/enhancing-cross-border-payments-stage-3-roadmap/>

¹⁰ Murphy, Chris. (2021, February 19). *Remittance*. Investopedia. <https://www.investopedia.com/terms/r/remittance.asp>

¹¹ Consumer Financial Protection Bureau. (n.d.). *Summary of the final remittance transfer rule (amendment to Regulation E)*. Retrieved May 3, 2021 from https://files.consumerfinance.gov/f/201305_cfpb_remittance-transfer-rule_summary.pdf

¹² The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd Frank) is a sweeping reform legislation enacted in 2010 to reorganize significant aspects of the U.S. Financial Regulatory System after the Financial Crisis of 2007-08 and the ensuing “Great Recession.” Among the changes included the creation of the Consumer Financial Protection Board (CFPB), which has oversight as to protection of consumers with respect to payments, mortgages, investments among other financial activities.



countries. Additional efforts to ensure such compliance should be ameliorated by developments in regulatory technology (RegTech)¹³.

Transparency

C2C remittances frequently have limited data transport capabilities, meaning the payment message cannot always convey additional information, such as a reference number or memo. There are multiple intermediaries and systems involved in the transaction, resulting in the inability to reliably carry the full data set from the payer to payee. Unknown to the payer or the sending institution, the receiving institution can add charges to the received payment based on local country requirements, effectively reducing the value of the remittance. In many cases, payers are unaware of the payee's receipt of funds unless communication is directly established outside of the delivered payment experience.

Risk

Risk, as it relates to payment delivery or exception handling, is also a key challenge. Although it might be assumed by both payer and payee that there are frameworks and controls to ensure a timely and full delivery of the payment, that is not always the case and funds can remain in limbo, without benefit to the remitter or payee while investigations are undertaken.

Furthermore, given the lack of shared standards in a decentralized system, it is relatively difficult to ensure compliance with the unique laws and regulations across multiple jurisdictions, increasing the overall risk profile of cross-border transactions.

Consumer-to-Business (C2B)

Like C2C, the two most critical problems to solve for C2B use cases are **Speed** and **Cost**.

There is a wide range of payments available in the C2B segment, with certain use cases overlapping C2C and others B2B. Whether online or in-store, cross-border payments for consumer-related commerce is usually served by large global brands (e.g., Visa, Mastercard) without access to local payment systems. C2B payments represent a broad continuum of value in payment transactions from relatively low value (e.g., retail purchase) to high value (e.g., rare art, auto, education, etc.)

¹³ Frankenfield, Jake. (2020, August 27). *What You Should Know About RegTech*. Investopedia.

<https://www.investopedia.com/terms/r/regtech.asp>

Speed

In C2B, “speed” for a consumer can mean “faster” or “slower” depending on the financing needs of the individual, the urgency with which a payment needs to be completed, and in the case of a purchase, the type of good or service (e.g., digital versus physical). In cases where a faster payment or certainty of the payment is required (e.g., bill payment, certain one-time payments), some methods can be perceived as deficient, taking several days. Traditionally this is because the payment needs to go through several correspondent banks where, among other operations, regulatory compliance can impact the process. In other cases, such as the purchase of digital goods, global card brands and digital wallets often suffice. For bill payment, there are also emerging solutions to mirror a domestic biller direct model wherein billers provide instant confirmation of payment. Additional efforts to ensure such compliance should be ameliorated by developments in regulatory technology (RegTech)¹⁴.

Cost

Cost is a key discriminator for individuals making cross-border payments to businesses. Consumers are generally sensitive to all costs, including currency conversion, which may be off-market FX rates, and associated fees. Businesses also have a higher cost of accepting cross-border payments, whether in the form of higher interchange costs in the case of card, or other forms of payment, Know Your Customer / Anti-Money Laundering requirements also increase the total cost of ownership.

Business-to-Business (B2B)

B2B payments have challenges in **Speed**, **Cost**, and **Transparency**. Overcoming or minimizing these challenges offers the greatest motivators to deliver the desired user experience in this segment.

There are several relatively well-defined payment types available in the B2B segment, with certain use cases overlapping other segments. Since the B2B segment encompasses business entities with a broad continuum of sophistication, there is by necessity a bit of generalization in the discussion of this segment.

Speed

B2B payments represent the largest share of value of payments exchanged. There are potentially large systemic benefits to decrease the elapsed duration for payments transactions *writ large*. These are manifested particularly in the areas of corporate/business cash, working capital, and risk management for both payer and payee. An intrinsic benefit to enhanced speed in the transaction is an overall reduction in risk and increased transparency. Current limitations affecting the speed of transactions are the number of participants to the transaction, inclusive of the currency management portion(s) and correspondent banks, as well as sovereign oversight of incoming/outgoing transactions.

¹⁴ Frankenfield, Jake. (2020, August 27). *What You Should Know About RegTech*. Investopedia.

<https://www.investopedia.com/terms/r/regtech.asp>

Cost

Another challenge for B2B cross-border transactions is cost.

With B2B payments, transaction size and fees vary widely, where fees on larger transactions are nominally multiples of smaller transactions and fees on smaller transactions can be a significant percentage of notional value.

In addition to bank fees, a cost associated with all cross-border transactions is the facilitation of the foreign exchange (FX) inherent to the transaction. This is especially true with the types of large transactions inherent to the B2B payment experience. The FX market is an “over-the-counter” market by nature, and therefore subject to potential variations in the bid/ask levels of currencies involved. This bid/ask spread may be augmented by a service provider or by additional spread required by financial institution or Fintech intermediaries for access to FX market. These intermediaries can add cost as well as a negative impact on the transparency of rates and fees within the payment.

Lastly, there are costs to connect and manage corporate internal systems, such as financial accounting systems, inventory tracking, and management systems that need to interface with the B2B payments system. In today's payment systems, a lack of interoperability usually means these costs are multiplied by the number of disparate payment system connections required by the business operations.

There are at least two possible paths to improving the cost of cross-border transactions. The first is enhancing the extant processes via automation. As and when automation creates more efficient cross-border B2B transactions, there is the possibility that this may allow greater competition to drive costs down. Additionally, new processes/models may emerge that have significantly less friction (and therefore cost). A hypothetical example could be if a transaction could be done with fewer intermediaries and settled directly between two banks, no matter their size, and the potential use of multiple correspondent banks eliminated, the cost could be reduced.

Transparency

Today, significant upgrades and internal systems are required within businesses to achieve greater transparency into payment processes. This is no small ask from the corporates who will need to fund such a set of investments. An additional, and not insignificant, consideration is the number and range of existing technology and service providers.

Several practical issues that may diminish transparency include:

1. Vendors/solution providers already *in situ* in critical path operations may decide not to adapt this new standard.
2. Existing manual processes and exception handling will be challenging (and expensive) to accommodate. Edge cases always consume a disproportionate amount of resources.
3. New or newly needed integrations between service providers and the need to establish a governance structure to assure that compliance with agreed rules is maintained on both the account and transaction levels.

Additional challenges to be addressed by the shift toward faster payments will be that participants in the cross-border transaction need to reliably assess the status of their transactions and progress toward satisfaction. A high level of transparency needs to be achieved to provide the payer and the payee with tools and access to have real-time monitoring available to both the payer and payee.

Business-to-Consumer (B2C)

B2C payments have challenges in **Speed**, **Cost**, and **Ubiquity**, while **Transparency** is quickly becoming a greater expectation within this user segment.

The vast majority of B2C payments are low value and traditionally bank dominated. New entrants are rapidly emerging to provide a faster and more transparent service focused on these types of payments. Consumer expectations continue to lean toward faster crediting of their accounts and transparency of payment status as a key aspect of customer service and user experience. Consumers are sensitive to fees and exchange rates which can vary depending on payment method. The challenge facing businesses is effectively delivering on the key requirements for B2C payments below.

Speed

Speed is a key aspect of the payment experience for consumers awaiting payments from businesses. In payroll cases, there is a global rise in the gig economy¹⁵ in which employees receiving payment on demand is becoming more prevalent. Insurance disbursements are also more visible with the need to send assistance quickly to areas impacted by major events such as natural disasters. Many of the top marketplaces have taken advantage of lag time in their payments to sellers and offer financing and advances when these sellers need more immediate liquidity, which benefits the payer and provides a market opportunity for the payee.

¹⁵ The Gig Economy refers to a labor market of short-term or freelance work rather than holding long-term or full-time permanent jobs.



Cost

Cost is another critical user experience dimension for B2C payments. Consumers and businesses are sensitive to currency conversion and associated fees.

Ubiquity

The majority of B2C payments (including government-to-consumer) are made to bank accounts. This reliance on bank-to-bank transfers limits the number of total accessible consumers globally as it would not reach those consumers without traditional bank accounts. That said, the emergence of global payment Fintech companies has provided access to various payment rails which also expands the number of accessible consumer accounts abroad.

Transparency

The rise of these Fintech companies also has highlighted the need for increased transparency in payment status and fees.

User Experience Conclusion

Cross-border payments use cases can be segmented into four broad categories: C2C (Consumer-to-Consumer), C2B (Consumer-to-Business), B2B (Business-to-Business), and B2C (Business-to-Consumer). The user requirements of each segment vary depending on the nature of the experience; however, each payment experience can be evaluated across the **dimensions of Speed, Cost, Ubiquity, Transparency, and Risk**. The similarities and nuances of these needs require careful consideration when building systems that will deliver faster cross-border payments.

Delivering Faster Cross-Border Payments

Based on the above on user experience requirements, the industry must consider how it can work together to create payment systems that deliver the **Speed, Cost, Transparency, and Ubiquity** while adequately addressing associated **Risk**. To achieve these goals, faster cross-border payment systems will need to incorporate approaches to interoperability and settlement beyond what exists today. These aspects are explored below.

Interoperability Overview

Cross-border interoperability can create predictable user experiences to send and receive cross-border payments regardless of the payee's or payer's access point in the global payment ecosystem. Interoperability is required to expand the use of U.S. faster payment solutions to include the outlined user requirements for cross-border payment experiences.



From the user's perspective, interoperability means a payment can be sent or received across systems and currencies in a seamless manner that meets expectations across **the dimensions of Speed, Cost, Ubiquity, Transparency, and Risk**. From a systems perspective, interoperability means the method used to create the required cooperative relationships between complex systems of technology, payment operator rules, and regulatory frameworks to deliver the desired user experience.

Interoperability Models

Interoperability defines the relationships between participant institutions to allow the necessary cooperation for cross-border payments. These relationships form the foundation for the various settlement models explored across existing and evolving system designs. The paper outlines three models with an aim to: (1) highlight how each model operates across the movement of information (messaging) and the movement of money (settlement), and (2) offer considerations for pros and cons. Details on the various forms of settlement within these models are covered later.

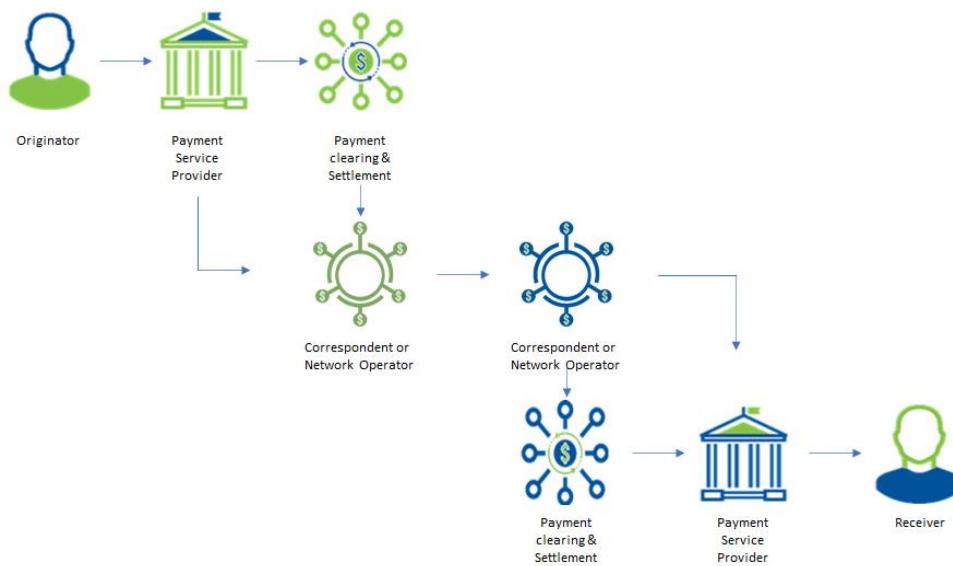
Cross-Border Interoperability Model Description

Interoperability Model	Description
Bespoke	Point-to-point messaging and settlement relationships between institutions set up and negotiated on a one-off basis. Each system participant is responsible for creating and maintaining relationships with other network participants. Interoperability is established through "many-to-many" relationships.
Centralized	Hub-and-spoke messaging and settlement relationships between institutions with an intermediary acting the central connecting entity. A hub system where a single messaging and settlement relationship with an intermediary allows access to all other network participants. Interoperability is established through a "one-to-many" relationship.
Hybrid	A multi-hub system inclusive of intermediaries where a single messaging and settlement relationship allows access to an interconnected network of participants.

Bespoke Interoperability

The bespoke approach to interoperability is the default approach for today's cross-border payments. The use of Society for Worldwide Interbank Financial Telecommunication (SWIFT) for messaging and a network of correspondent banks for settlement is an example of bespoke interoperability. In this model, institutions form tailored relationships with other institutions and domestic payment systems to create the messaging and settlement agreements to allow for cross-border payments. Usually, messaging and settlement functions are handled and managed by different network operators.

Diagram of bespoke interoperability between various participants:



When implemented by banks with a large correspondent network, the bespoke approach delivers ubiquity. Further, comprehensive implementation of SWIFT gpi (global payment initiative) and adherence to these protocols by the network participants potentially will improve the transparency¹⁶ of the transaction which, in turn, will improve relative speed of the transaction.¹⁷ Each participant can define requirements based on specific needs, including who participates and what regulatory and governance requirements need to be addressed at the institutional and government levels.

However, ubiquity often comes at the expense of speed, cost, and transparency. In order to facilitate payments to institutions where a direct relationship does not exist, chains of institutions are required to pass the payment and related transaction details along the established point-to-point relationships. Each relationship is a potential point of failure.

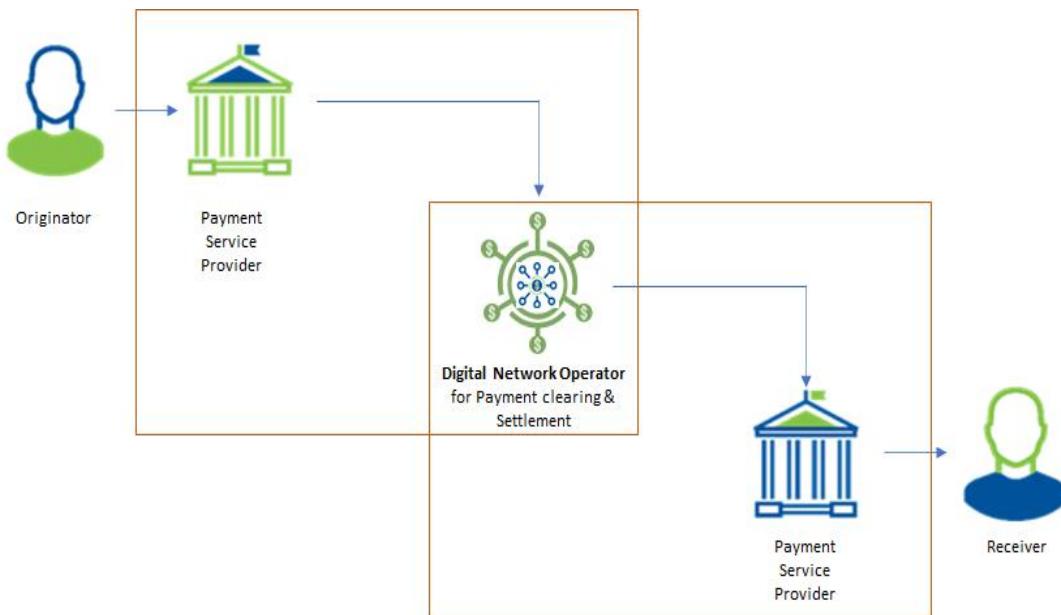
Centralized Interoperability

A centralized approach to interoperability requires an operator to act as the single point of connectivity for network participants across messaging and settlement. This operator dictates the standards, rules, and governance to the network creating standardization for all participants. This model substantially improves the user experience in the dimensions of speed and cost but is challenged with building ubiquity.

¹⁶ SWIFT. (2020, October). *SWIFT gpi Driving a Payments Revolution*. <https://www.swift.com/swift-resource/249536/download>

¹⁷ Note: This may not be fully addressed from the Faster Payments effectiveness criteria.

Diagram of centralized interoperability between various participants:



The centralized interoperability model allows for significant reductions in cost and increases in speed, while delivering a high level of transparency to all users. Since the central network operator has control over defining system requirements for all participants and the aggregation of a substantial economy of scale with regard to payment operations and liquidity, payment experiences have the potential to be optimized.

The centralized model is presumed to run on an independent network, with benefits potentially accruing only to those who participate. This level of centralization and system control also means ubiquity is challenging; participants need to be motivated to rely on a single operator.

Emerging Technologies for Interoperability

Blockchain based payment networks have the potential to decrease the necessity for trusted intermediaries and centralized governance. The entity acting as the single operator could potentially be replaced by a blockchain payment network. In this model, instead of trusted counterparties to facilitate value exchange, an autonomous ledger technology can act as a central point where participants connect to transact with each other. The decentralized autonomy of the ledger is a result of the technical system of validation used to conduct payments through open and distributed computing networks. The blockchain technology allows each participant to utilize, maintain and validate the payment infrastructure required for peer-to-peer value transfers that are fast, transparent, and cost effective.

Cryptocurrency blockchain-based networks use novel units of monetary value that are not managed by Central Banks and can be transacted simply and without interaction with any traditional financial institution. These assets have the benefit of acting without any trusted counterparties. While this may have the added benefit of faster and potentially cheaper payments, price volatility of the novel asset is a natural inhibitor of payment adoption. In other cases, "stablecoins" can be leveraged to mitigate price volatility for payment use cases. A stablecoin is an asset-backed cryptocurrency where the value is stabilized by a ratio of fiat currency held by a financial institution. The downside of these stablecoins is that while price volatility is mitigated, the reliance and trust of a custody counterparty reintroduces counterparty risks that are not present with other cryptocurrencies.

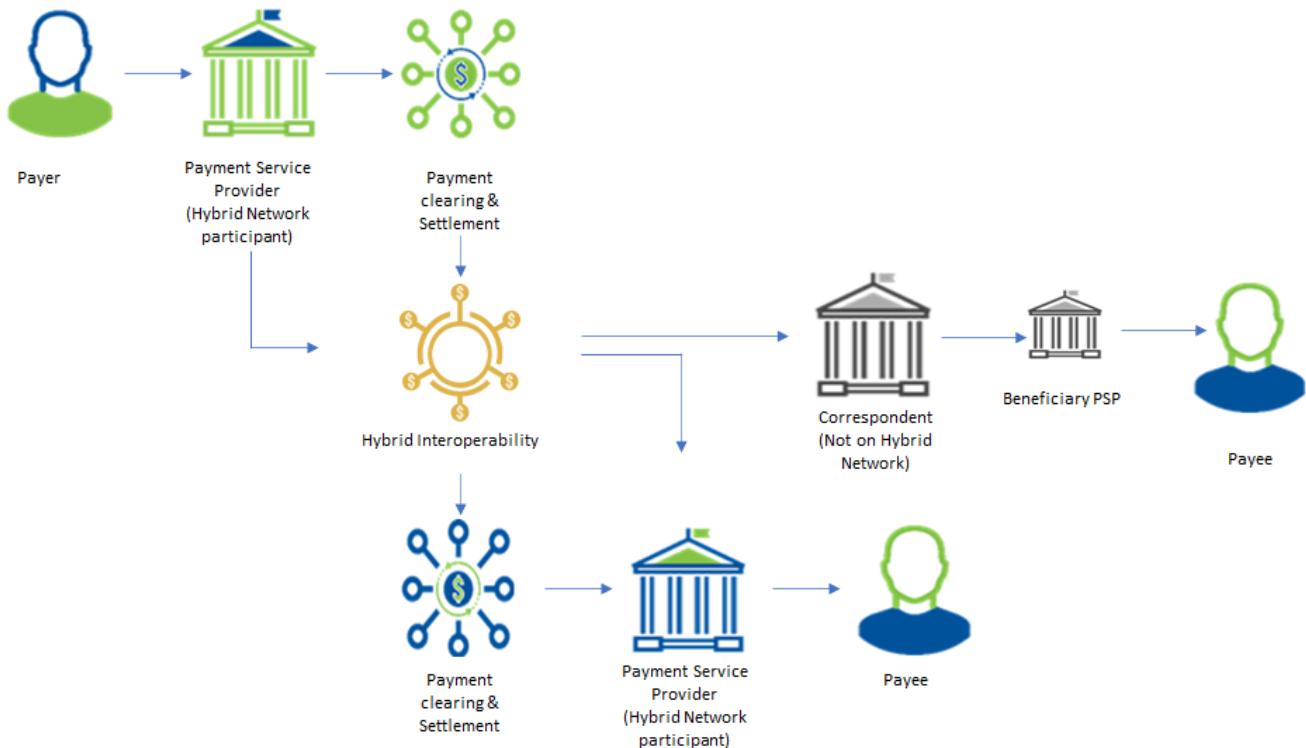
These emerging technologies and networks will further open for consideration the concept of digital currencies while Central Banks continue to develop guidelines for regulated adoption. On a global scale, these new systems introduce new risk considerations and payment frameworks that are still to be defined.

Hybrid Interoperability

In a hybrid approach to interoperability networks, participants, and technologies work in cooperation to allow connectivity between their respective systems to leverage the benefits of the bespoke and centralized models while mitigating the defects. The mix and match capabilities of this approach have the potential to seamlessly facilitate transaction messaging and settlement among the participants of the respective networks.

Hybrid models, for example, work to establish and utilize their broad international network for seamless messaging communication across the network participants. At the same time, new technologies potentially ensure immutable transaction processing and messaging for the purpose of transaction speed and accuracy. The settlement risk also can be reduced to a minimum, where all network participants use good funds settlement, although various settlement models can be seamlessly adapted.

Beneficiary banks not participating on the hybrid network still can benefit by exploring correspondent banking relations to expand their reach and to better serve their customers. Furthermore, the correspondent bank may use the local payments market infrastructure to settle the transaction with the beneficiary's bank. Eventual growth of hybrid networks with more and more direct participants will reduce a need for correspondent banks.



Apart from speed, the hybrid model is also expected to bring the benefits of transparency (as in the centralized model) and may also partially address ubiquity due to the wider reach that can be achieved through correspondent banking mechanisms. However, cost challenges may persist (to a lesser degree) because of the initial infrastructural investment by network operators.

This model has the potential to represent the truest form of interoperability. The key requirement for the hybrid model is for cooperation and coordination of payment operators and regulators to fuse the bespoke and centralized models with the additional advantage of available digital technologies into a superset that provides consumers, businesses, and governments with a faster, more ubiquitous, and less costly cross-border payment experience. A comprehensive operating model framework needs to evolve to get the best out of the hybrid interoperability model.

Settlement Overview

Within each interoperability model, the various participants have the option of determining the method for the exchange of value. The movement of funds is critical - it constitutes the end goal of the payer and payee, which is to transfer value between parties. This paper considers the types of settlement possibilities that can be employed across interoperability models in the section below. These options primarily affect the user experience with a trade-off between cost and speed.

Settlement Models

Cross-Border Settlement Model Description

Settlement Model	Description
Real-Time Gross Settlement	Settlement where each payment is submitted individually and instantly without batching or netting.
Deferred Net Settlement	Settlement where payments are held to a predefined settlement cycle when obligations are calculated and netted against each other prior to settlement.
Hybrid Settlement	Settlement where payments are either submitted instantly or held for programmatically determined settlement cycles for netting prior to settlement.

Each of the interoperability models discussed in previous section has direct relevance to various settlement models listed above and has pros and cons with respect to the Faster Payments Effectiveness Criteria. Please refer to Appendix [2] for details.

Real-Time Gross Settlement

Real-time gross settlement (RTGS) refers to a settlement process that allows for the near-instantaneous transfer of funds typically leveraging pre-funded accounts. In this model, funds are quickly transferred between participants or systems, resulting in the fastest possible settlement times.

RTGS requires pre-funding of accounts or access to liquidity to settle a payment instantly. This liquidity requirement makes this model the fastest but also the most expensive.



Deferred Net Settlement

Deferred Net Settlement refers to a funds transfer system that allows for netting of payments between participants prior to settlement. This allows for a highly capital efficient funds transfer since offsetting inbound payments with outbound payments decreases the size of pre-funded accounts or amount of liquidity needed. In these deferred netting schemes, payments are held over periods of time to allow for netting to take place. This creates a slower transfer experience but allows for lower payment costs.

This net settlement requirement makes this model the slowest but also the least expensive.

Hybrid Settlement

Hybrid settlement is a cross between RTGS and Deferred Net Settlement. Based on system parameters, certain payments are submitted for RTGS while other payments, primarily determined by payment size, are held for deferred net settlement. This offers opportunities for complex and dynamic payment queueing schemes where first-in, first-out processing is bypassed, and payments are netted on a best-match basis.

The hybrid model is a moderately fast and inexpensive alternative between straight RTGS and Deferred Net Settlement schemes. While it has the potential to better accommodate various user experience requirements through a single model, the additional complexity from reconciliation operations and liquidity make the model more difficult to operate.

Interoperability & Settlement Models Fit vis-a-vis User Experience Framework

The underlying interoperability and settlement models of a Faster Payments ecosystem will have a direct impact on the end user experience and effectiveness criteria as outlined. The associated matrix (shown below) is not meant to be conclusive, rather it indicates with respect to a particular dimension whether a model is directionally positive, directionally neutral, or directionally negative.

		Cross-Border Models				
DIMENSIONS		INTEROPERABILITY			SETTLEMENT	
		Bespoke	Centralized	Hybrid	Real-Time Gross Settlement	Deferred Net Settlement
	Speed	➡	➡	➡	➡	➡
	Cost	➡	➡	➡	➡	➡
	Ubiquity	↔	↔	➡		
	Transparency	➡	➡	➡	➡	➡
	Risk	↔	↔	➡	➡	↔

By way of example, in case of interoperability, speed in a bespoke model is a consistent challenge, moderated by “single-hop” transactions between large networks. This is represented as mostly negative. In a centralized model, most of the dimensions are directionally positive since the network player can directly operate between participating service providers by avoiding any intermediaries. This mechanism can continue even in hybrid model, with appropriate operating framework in place for all the network players.

Similarly, cost can vary based on the number of hops in a transaction, with bespoke likely having more multi-hop transactions than either the centralized or hybrid models.

In case of ubiquity, bespoke models are known for ease of access (and hence, directionally positive), whereas centralized models are directionally neutral since access points for sophisticated network operators will have some challenges. These challenges may be addressed to a great extent in hybrid models.

Impact Areas

While this paper has considered the interoperability and settlement methods currently available to meet user experience needs, there are many other considerations that payment service providers must consider when building cross-border faster payments systems. Most notably, participants will need to work toward *standardized message structures* to promote Straight Through Processing (STP) and reduce exception handling and reconciliation issues, all of which can impact speed.

Similarly, the other potential impacted area is *payee identification or Alias Directory*. These directories are known to increase STP, a function of speed which is a vital in case of cross-border transaction. Building and managing such directories in domestic context could be relatively simpler, however there will be potential challenges to build international payer/payee directories due to wide variety of regulatory issues including but not limited to user consent under the General Data Protection Regulation (GDPR).

The extension of faster payments availability (24 x 7 x 365) to cross-border requires *Foreign Exchange* availability either to payee or payer whenever working through cross-currency transactions.

Lastly, cross-border payments have all the risks of domestic payments such as *risk of counterparty default* or delayed payments from lack of liquidity at the receiving institution. The challenges will be exacerbated to the extent that faster payments are *irrevocable* in nature and interactions between different global payment systems are governed by *different regulations*.

Delivering a Faster Payments Cross-Border System

As user demands continue to grow, the payments industry must act to meet customers' demand for faster, safer, and more secure payments. As outlined in this paper, differences in user needs mean there will not be a one-size-fits-all solution. Instead, interoperability between systems is required along with the flexibility to extend support to include hybrid models of moving information and value.

Faster payments inherently highlight characteristics of speed, cost, transparency, ubiquity, and risk in a payment transaction. The way money moves today across borders involves a complex network of pairs of banking partners and equivalent handshakes making all the required characteristics of faster payments difficult to achieve. While this paper endeavors to outline and discuss the myriad challenges involved with cross-border interoperability and settlement, achieving a faster payments cross-border system requires a multi-country agreement about standards and cooperation. Influential payments industry groups, combined with national and regional bodies that have been driving local faster payments, must come together to agree on methods of interoperability, settlement, and messaging to provide a cross-border faster payment.¹⁸

¹⁸ There are examples successfully working to establish the multi-country/cross-border faster payments ecosystem today, including but not limited to P27, a multi-country payment system in the Nordics, or the WAEMU and EAPS in West and East Africa, respectively.



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A. Glossary of terms

Term	Definition
Bilateral Settlement	<p>Bilateral net settlement systems are payment systems in which payments are settled between two banks. Banks that send out more funds in transfers than they receive (i.e., banks with a positive net settlement balance) are credited with the difference, and banks with a negative net settlement balance pay the difference. Bilateral settlement systems require the final resolution of payments made between two banks over the course of a day. These are due to be settled at the close of business, typically via a transfer between their accounts at the central bank.</p>
Deferred Net Settlement	<p>A system which settles on a net basis at the end of a predefined settlement cycle (typically at the end of, but sometimes during, the business day). They are settlement systems in which payment obligations can be deferred to be paid at a later time, based on the agreement between the parties involved.</p>
Hybrid Settlement Model	<p>The hybrid mechanism is managed by an intermediary and is particularly suitable to settle large volume of small-value retail payments. A hybrid settlement mechanism integrates features of real-time gross settlement, deferred net settlement, and central queue management structure.</p>
Multilateral Settlement	<p>In a multilateral net settlement system, the parties settle once, on a net (credits minus debits) basis with many other parties. Transfers received by a bank are offset against those sent out – here, “transfers” refer to the sum of all funds received and sent to banks that are part of the settlement system.</p> <p>If the sum is positive, the bank is said to be in a multilateral net credit position; if the sum of transfers is negative, the bank is said to be in a multilateral net debit position.</p>
Net Settlement	<p>The settlement of transfer orders on a net basis. A funds or securities transfer system which settles net settlement positions during one or more discrete periods, usually at pre-specified times during the business day.</p>

Real Time Gross Settlement (RTGS)	A settlement system in which processing, and settlement takes place on a transaction-by-transaction basis in real time.
OFAC	Office of Foreign Assets and Control
Net Settlement vs. Gross Settlements	<p>An alternative payment/settlement system is the Real-Time Gross Settlements System (RTGS), in which each transaction is settled with immediate payments, unlike net settlements, which are summed up and aggregated at the end of the day, before being paid.</p> <p>Given that net settlements are not paid immediately, the risk of an institution or bank defaulting on their debt is higher in the net settlement system compared to the RTGS system, where default risk is.</p>
SWIFT gpi	SWIFT gpi is a new initiative by SWIFT to ensure cross-border payments meet industry's need for speed, transparency, and traceability of a transaction. It allows banks to provide their customers with a rich payments experience.

Appendix [1]

USE CASE SEGMENT BY PAYMENT METHOD

Use Case Segment	Range of Payment Methods Considered *
Consumer-to-Consumer (C2C)	<ul style="list-style-type: none"> ● High-Value <ul style="list-style-type: none"> ○ Bank transfers: Wire/SWIFT bank transfer ● Low-Value <ul style="list-style-type: none"> ○ Bank/account to account transfers <ul style="list-style-type: none"> ▪ International Automated Clearing House - local clearing ▪ Fintechs such as TransferWise, Revolut, Xoom ○ Agent transfers <ul style="list-style-type: none"> ▪ Agent-to-Agent (like Western Union) that allow for cash pick up or delivery ○ Mobile money deposit <ul style="list-style-type: none"> ▪ Payments to mobile money solutions, typically a service offered by Mobile Network Operators (MNOs) and Money Transfer Operators (MTOs) such as M-Pesa or WeChat Pay ○ Card-based transfers <ul style="list-style-type: none"> ▪ Payments to debit/credit/prepaid cards leveraging card networks (i.e., Mastercard Send, Visa Direct)
Consumer-to-Business (C2B)	<ul style="list-style-type: none"> ● High-Value <ul style="list-style-type: none"> ○ Bank transfers: Wire/SWIFT bank transfer ● Low-Value <ul style="list-style-type: none"> ○ Global card brands <ul style="list-style-type: none"> ▪ Credit cards ▪ Direct transfer ○ Digital wallets <ul style="list-style-type: none"> ▪ PayPal ○ Bank transfers <ul style="list-style-type: none"> ▪ International Automated Clearing House - local clearing ○ Agent transfers <ul style="list-style-type: none"> ▪ Agent to Agent (like Western Union) ○ Mobile money deposit <ul style="list-style-type: none"> ▪ Payments to mobile money solutions, typically a service offered by Mobile Network Operators (MNOs) and Money Transfer Operators (MTOs) such as M-Pesa or WeChat Pay

Business-to-Business (B2B)	<ul style="list-style-type: none"> ● High-Value <ul style="list-style-type: none"> ○ Bank transfers: Wire/SWIFT bank transfer ○ Service Provider: i.e., Wise, Ripple, Payoneer, et alia ● Low-Value <ul style="list-style-type: none"> ○ Bank transfers ○ Service Providers ○ Credit Card (predominantly business/corporate cards or personal cards of business owners)
Business-to-Consumer (B2C)	<ul style="list-style-type: none"> ● High-Value <ul style="list-style-type: none"> ○ Bank transfers: Wire/SWIFT bank transfer (Insurance Disbursements) ● Low-Value <ul style="list-style-type: none"> ○ Bank transfers <ul style="list-style-type: none"> ▪ International Automated Clearing House - local clearing ▪ SWIFT/ Local Wire services ○ Fintechs - Hyperwallet, Payoneer (Wages and Salaries) ○ Digital Wallets <ul style="list-style-type: none"> ▪ PayPal ○ Card-based transfers <ul style="list-style-type: none"> ▪ Payments to debit/credit/prepaid cards leveraging card networks (i.e., Mastercard Send, Visa Direct) ○ In-store accounts for storing value of sellers before cashing out

* References made to various organizations, institutions, fintechs or selective payment methods in this table are only examples or general practices observed in the industry. This document in no way endorses or promotes any of them or what-so-ever against the respective use case segment.

Appendix [2]

Faster Payments Cross-Border Settlement Models

Account Structure		Settlement Mechanisms		Pros	Cons
Bespoke	Point to point accounting relationships between institutions set up and negotiated on a one-off basis. Each system participant is responsible for creating and maintaining relationships with other network participants. "Many to Many"	Negotiated on point-to-point basis. Most likely RTGS	In bespoke account structures it is very difficult to prescribe a settlement mechanism due to the one-off basis of relationships set up on a peer-to-peer basis. More than likely, the default settlement mechanism is Real Time Gross Settlement: The term real-time gross settlement (RTGS) refers to a funds transfer system that allows for the near instantaneous transfer of money usually leveraging pre-funded accounts.	-No centralized system risk -Most scalable method for geographic penetration -RTGS has the potential for instant payments	-No standardization or rules -Most expensive settlement model -Payment visibility is a challenge
Centralized	A "hub" system where a single accounting relationship allows access to all other network participants. "One to Many"	RTGS	Real-time gross settlement (RTGS) refers to a funds transfer system that allows for the near instantaneous transfer of money usually leveraging pre-funded accounts.	-Standardized technology and rules/regulations -Fastest Settlement Model -Payment status visibility	-Most Expensive Settlement Model -Centralized System Risk
		Queueing	A deferred settlement model that allows for pending settlement payments until sufficient liquidity is available on a first in, first out (FIFO) basis.	-Standardized technology and rules/regulations -Cost improvement over RTGS -Payment status visibility	-Moderately Expensive Settlement Model -Slower Settlement vs RTGS -Centralized System Risk
		Deferred Net Settlement	A deferred netting scheme where FIFO payments are queued until netting opportunity is presented on a time basis, i.e., 12 hours.	-Standardized technology and rules/regulations -Cost Effective Settlement -Payment status visibility	-Slowest Settlement Model -Usually requires a credit backstop -Centralized System Risk
		Dynamic Queueing	A complex dynamic queueing scheme where FIFO is bypassed, and payments are netted on best match basis...optimize liquidity and minimize rejects.	-Standardized technology and rules/regulations -Lowest Cost at scale of all models -Second Fastest Model behind RTGS -Payment status visibility potential	-Complex Model that requires rules on payments sizes -Requires substantial transactions of similar volumes -Centralized System Risk

Account Structure		Settlement Mechanisms		Pros	Cons
Hybrid	A multi "hub" system where a single accounting relationship allows access to a subset of network participants but not all. Multiple relationships with various "hubs" are required for full access to network participants.	RTGS	Real-time gross settlement (RTGS) refers to a funds transfer system that allows for the near instantaneous transfer of money usually leveraging pre-funded accounts.	-Partially standardized technology and rules/regulations -Fastest Settlement Model -Payment status visibility potential	-Most Expensive Settlement Model -Centralized System Risk
		Queueing	A deferred settlement model that allows for pending settlement payments until sufficient liquidity is available on a FIFO basis.	-Cost improvement over RTGS -Payment status visibility potential	-Moderately Expensive Settlement Model -Slower Settlement vs RTGS -Centralized System Risk
		Deferred Net Settlement	A deferred netting scheme where FIFO payments are queued until netting opportunity is presented on a time basis, i.e., 12 hours.	-Cost Effective Settlement -Payment status visibility potential	-Slowest Settlement Model -Usually requires a credit backstop -Centralized System Risk
		Dynamic Queueing	Complex dynamic queueing scheme where FIFO is bypassed, and payments are netted on best match basis...optimize liquidity and minimize rejects.	-Lowest Cost at scale within Hybrid -Second Fastest Model behind RTGS within Hybrid -Payment status visibility potential	-Complex Model that requires rules on payments sizes -Requires substantial transactions of similar volumes -Centralized System Risk