Project Meridian FX APAC: Executive summary and introduction

This page explains why the project matters, what was tested, the main insights, and how the technical and policy reports should be read together.

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Bank of England BANK OF THAILAND MAS Monetary Authority of Singapore

Contents

Key points

Executive summary

Why this matters
What we did
What we found
Next steps

Introduction and background

The FX settlement challenge
What is synchronisation?
Building on previous work
Project objective
How the reports fit together
Reading the reports together
Important caveat

Annex – Project Meridian FX APAC participants and contributors

Participating central banks
Observer central banks (contributors to the Policy workstream and report)
Technical partner

Project Meridian FX APAC explored how synchronisation could support safer and more efficient foreign exchange settlement across different central bank money systems. It examined whether a common synchronisation model could operate across systems with materially different architectures and capabilities, and how those differences affected implementation complexity and the functions performed by the Synchronisation Operator (SO).

Key points

- Meridian FX APAC demonstrated that synchronisation[1] could support atomic payment-versus-payment (PvP) settlement across different wholesale settlement systems. This was achieved across three central bank wholesale settlement test environments with materially different architectures and capabilities.
- Multilateral net FX PvP was also demonstrated across the three experimental environments, potentially improving liquidity efficiency while preserving atomic settlement[2] outcomes.
- System capabilities affected implementation complexity and the functions performed by the SO. Capabilities such as authorised third-party access and funds reservation can support a model in which the operator co-ordinates settlement without holding participants' funds.
- The exception scenarios tested provided encouraging evidence that synchronisation could preserve the integrity of linked settlement when errors or outages occurred, although important real-world conditions remain for further testing.
- The appropriate policy treatment would depend on the functions performed by the synchronisation operator and their materiality. Internationally developed principles or expectations could, if considered useful, provide a more consistent basis for assessing synchronisation operators across jurisdictions, while avoiding the assumption of a single service design.

Executive summary

Why this matters

FX settlement links participants, currencies and infrastructures across jurisdictions and is critical to cross-border payments. Existing arrangements have substantially reduced settlement risk, but do not cover all market participants, currency pairs and trade types, and FX settlement can still involve risk, liquidity demands and operational complexity.[3]

At the same time, wholesale settlement arrangements are evolving. Innovation is creating opportunities to enable real-time FX settlement arrangements that allow financial institutions to access liquidity when needed and manage it efficiently across borders. Central banks are also modernising wholesale payment systems in different ways, with some upgrading account-based Real-Time Gross Settlement (RTGS) systems, while others explore tokenised money and distributed ledger technologies.

While this diversity can support different domestic priorities, it increases the challenge of ensuring that these systems can interoperate effectively across borders.

Synchronisation is one possible approach to enabling such interoperability. It co-ordinates transfers across separate systems with the aim of ensuring that linked payments complete together or do not proceed. This could enable settlement in central bank money in each jurisdiction using the existing domestic infrastructure.

What we did

Meridian FX APAC connected a SO prototype to three simulated wholesale settlement environments with different architectures and ways of processing instructions. The project tested:

- bilateral PvP settlement of the two central bank money legs of an individual FX transaction;
- multilateral net FX PvP across three settlement systems, incorporating a mechanism designed to reduce liquidity needs by settling multiple eligible transactions together; and
- selected exception scenarios, including insufficient funds, invalid account identifiers and temporary infrastructure outages, to examine whether linked settlement could remain intact when something went wrong.

The experiment focused on co-ordination between the operator and the settlement systems. It did not reproduce the full FX trade lifecycle, live participants or production operating conditions.

The experiment focused on two core use cases:

- Atomic FX PvP settlement: the first use case examined whether synchronisation could support atomic PvP settlement of individual FX transactions across different central bank payment systems. Under this model, settlement occurs if, and only if, all linked payment legs are ready to settle, reducing the risk that one party delivers funds without receiving the corresponding currency.

- Multilateral net FX PvP: the second use case explored whether synchronisation could support liquidity-saving arrangements across three or more participating systems. This involved testing whether groups of FX transactions could be co-ordinated and settled more efficiently without compromising the integrity of synchronised settlement.

Partior acted as the project's technical partner. It supported the development and configuration of the SO prototype, its integration with the three simulated settlement environments, the execution of the technical experiments and the documentation of the results, working with the participating central banks.

Alongside the technical experimentation, a policy workstream examined what would be needed for synchronised FX settlement to operate in practice. The workstream was developed by the Bank of England, Monetary Authority of Singapore and Bank of Thailand, with Bangko Sentral ng Pilipinas and the Reserve Bank of Australia contributing as observer central banks.

The accompanying policy report considers the operator's functions, the risks and safeguards associated with them, the relevance of existing frameworks and the questions that may require domestic or cross-border consideration.

What we found

First, synchronisation worked across systems with materially different technologies and operating models. This suggests that cross-border interoperability does not necessarily require central banks to converge on a single infrastructure design.

Second, synchronisation was more straightforward where systems could support third-party access, and the ability for third parties to earmark funds and initiate settlement. Where these were not available directly, the experiment used system-specific adaptations. These adaptations made PvP settlement possible in the experiment but added complexity and could expand the operator's responsibilities if implemented in practice. For example, in MAS' test environment, the SO managed a dedicated escrow account to replicate funds reservation. This reflected the design and capabilities of the experimental system and is not an inherent feature of synchronisation or a proposed model for a future SO.

Third, Multilateral net FX PvP was technically achievable across the three environments. This suggests synchronisation could potentially reduce liquidity requirements while supporting timely, atomic settlement. However, achieving these benefits required effective cross-system co-ordination. In particular, the key challenge extended beyond calculating net positions to co-ordinating a common set of transactions for settlement across all systems while the necessary liquidity remained reserved. Differences in the information and processing supported by each system influenced how efficiently this could be done and which functions sat with the operator.

The allocation of netting-related functions also differed across the three environments. Differences in system processing models affected the form in which settlement instructions were submitted and the extent to which the synchronisation operator calculated offsetting positions. More granular status and failure information could help reduce co-ordination complexity by enabling transactions that could not be executed to be identified and removed more efficiently.

Fourth, the selected exception scenarios provided encouraging evidence that synchronisation could preserve the integrity of linked settlement when errors or outages occurred. Across the scenarios tested, the SO was able either to complete settlement or fully unwind the transaction without leaving individual payment legs to proceed independently. The experiment also highlighted the importance of idempotency, queryable transaction-status information and reliable event delivery in reducing uncertainty following failures or outages. However, important real-world constraints were not fully tested, including non-overlapping operating hours, time-zone differences, earmark expiry and prolonged outages.

Finally, the policy analysis considered the SO through five lenses: access and assurance; regulatory perimeter and oversight; settlement finality; governance and accountability; and data and information sharing. It found that system design and capabilities can affect the functions and responsibilities performed by the operator, which in turn shape its risk profile and the relevant policy considerations. Existing frameworks provide useful building blocks, but not a ready-made model for synchronisation. Some questions, including access to

domestic settlement infrastructure and the assurance or oversight of an operator, would primarily sit within individual jurisdictions. Others, including settlement finality, accountability and co-operation between authorities, arise from co-ordinating settlement across jurisdictions.

The policy analysis also distinguishes technical atomicity from legal settlement finality: co-ordinating payment legs so that they settle atomically does not by itself establish a common, legally recognised settlement outcome across separate domestic systems and jurisdictions. A live arrangement would therefore raise questions on the applicable rules, responsibilities and legal effect of actions taken across those systems.

Internationally developed principles or expectations could, if considered useful, provide a more consistent basis for assessing SOs across jurisdictions, while remaining proportionate to their functions and materiality and avoiding the assumption of a single service design.

What the findings mean for…

Relevant institution(s)	Implications	Questions for consideration
Central banks operating wholesale settlement infrastructure	Different approaches to domestic infrastructure modernisation may remain interoperable, provided that the functional capabilities needed for synchronised settlement can be supported. Greater alignment in capabilities such as authorised third-party access, funds reservation and settlement initiation could reduce the need for alternative operating arrangements and the additional complexity and responsibilities these can create.	Which capabilities should central bank settlement systems provide directly, and where might alternative integration approaches be appropriate?
Industry participants and prospective SOs	A common co-ordination model can operate across different settlement systems, but differences between systems may affect integration complexity and the functions performed by the operator.	Can synchronisation services remain scalable, operationally manageable and appropriately controlled where integration models differ across jurisdictions?
Regulatory and oversight authorities	The policy and regulatory implications depend primarily on the functions performed by the operator, as well as its scale and influence over settlement outcomes. Internationally developed principles or expectations could, if considered useful, support greater consistency in assessing SOs across jurisdictions.	Which issues can be addressed within domestic frameworks, and which may require cross-border co-operation or broader international co-ordination?

Next steps

Meridian FX APAC provides a foundation for further exploration of how synchronisation could support FX settlement across different systems and jurisdictions. The findings provide evidence and practical insights to support further technical and policy work on synchronisation, wholesale settlement innovation and cross-border payments.

For the Bank of England, the findings will also inform further development towards a live synchronisation service, in line with its commitment to launch synchronisation in 2028. Participation in this project does not imply an equivalent implementation commitment or a particular policy direction by the Monetary Authority of Singapore or the Bank of Thailand.

Further technical work could include:

- testing synchronisation across additional use cases, such as delivery-versus-payment, and a wider range of operating and liquidity conditions;
- modelling the role and behaviour of market participants more explicitly, supported by closer collaboration with industry; and
- expanding experimentation to additional jurisdictions to assess whether the findings continue to hold across a broader range of settlement systems and operating models.

Further policy work could include:

- applying the policy report's five policy lenses to specific service designs and participating jurisdictions, including assessing the legal effect and materiality of the operator's functions and identifying any gaps in existing domestic and cross-border arrangements; and
- considering which questions could be addressed through domestic frameworks, which may require cross-border co-ordination between participating jurisdictions and, where appropriate, where broader international discussion could be useful.

Further technical and policy analysis would be needed before conclusions could be drawn about the suitability of particular implementation models or policy approaches.

The participating central banks welcome continued engagement on the findings of Meridian FX APAC. Interested parties who would like to discuss the project or its potential applications are invited to contact the project team at ✉ **MeridianFXAPAC@bankofengland.co.uk**.

Introduction and background

The FX settlement challenge

FX settlement requires the exchange of payments across different currencies, settlement systems and jurisdictions. Although existing arrangements have significantly reduced settlement risk, challenges remain. Differences in market structure, operating hours, technology choices and access arrangements can create frictions that affect safety, efficiency and interoperability.

Reducing settlement risk and improving interoperability remain important priorities within wider efforts to enhance cross-border payments. As wholesale settlement infrastructures continue to evolve, it is increasingly important to understand how different systems can interact safely and efficiently without requiring a single common technology platform.

What is synchronisation?

Synchronisation is a mechanism that allows settlement in one system to be made conditional on settlement occurring in another system. In simple terms, it enables transactions across multiple ledgers or infrastructures to be co-ordinated so that all required transfers occur together or not at all.

Rather than connecting systems directly to one another, synchronisation typically relies on a co-ordinating entity, often referred to as a SO, that exchanges information with participating infrastructures and ensures that settlement only proceeds once agreed conditions have been satisfied. In the baseline model considered in the accompanying policy analysis, the SO co-ordinates settlement without holding participants' funds or maintaining settlement accounts. The experiment used alternative arrangements where particular capabilities were not available in the test environments; these are discussed in the technical and policy reports and are not inherent features of synchronisation or a future SO model.

This approach can support interoperability between different wholesale settlement systems while allowing each participating jurisdiction to maintain its own domestic settlement arrangements.

Building on previous work

Project Meridian FX APAC builds on previous experimentation with synchronisation, while sitting alongside a wide range of international initiatives exploring how cross-border settlement and liquidity management can be improved.

These initiatives span different approaches. For example, **Project Mariana** explored the cross-border trading and settlement of wholesale CBDCs, **Project Nexus** developed a model for linking domestic instant payment systems, and **Project Agorá** explores multi-currency wholesale cross-border payments on a shared programmable platform. Together, these initiatives illustrate different approaches to improving cross-border settlement, FX and liquidity management, and interoperability between payment arrangements.

Within this broader landscape, previous Meridian work has focused on synchronisation as an approach to co-ordinating settlement across otherwise separate systems. **Project Meridian** demonstrated how a SO could co-ordinate the transfer of funds in an RTGS system with the transfer of an asset on another ledger. **Project Meridian FX** extended this approach to FX, demonstrating that a technology-neutral SO could co-ordinate PvP settlement across different jurisdictions and technologies while also testing liquidity-saving features. The Bank of England's **Synchronisation Lab** has further extended this work by enabling industry participants to test a broader range of synchronisation use cases and operating models.

Against this background, Meridian FX APAC examines whether a common co-ordination process can operate across three distinct central bank money environments and support multilateral net FX PvP across them. Its contribution should therefore be viewed alongside other approaches to FX modernisation, cross-border liquidity management and atomic settlement.

Project objective

The overarching objective of Meridian FX APAC was to assess whether synchronisation could support PvP settlement across central bank payment systems with different architectures and capabilities, including multilateral net FX PvP, while identifying the capabilities, technical trade-offs and policy questions relevant to further work.

How the reports fit together

Technical Report

The **Technical Report** explains the experimental design, participating central banks' systems, synchronisation workflows and execution of the use cases. It presents the evidence generated in the technical experimentation, providing readers the technical context needed to interpret the findings.

Policy Report

The **Policy Report** considers how the functions tested in the experiment might be treated in practice. It provides a framework for examining the relevant legal, regulatory and operational questions across jurisdictions, without recommending a particular policy outcome.

Reading the reports together

The reports provide complementary perspectives on the same proposition. The Technical Report sets out the prototype, the different settlement environments and the evidence from the bilateral PvP, Multilateral net PvP and exception scenarios, alongside the experiment's assumptions and limitations. The Policy Report takes those findings as its practical starting point and considers how the operator's actual functions, legal effect and materiality shape the relevant risks and policy treatment. It uses existing frameworks as reference points and identifies the questions that may need to be addressed domestically, through co-ordination between participating jurisdictions or, where useful, through broader international discussion.

Taken together, the reports distinguish between flexibility in how interoperability can be achieved technically and the role that common principles or expectations could play, if considered useful, in supporting greater consistency in the assessment of synchronisation operators across jurisdictions.

Important caveat

Both reports are exploratory and should be read as inputs to further experimentation, analysis and cross-jurisdictional dialogue. They do not recommend a common implementation or policy approach across the participating jurisdictions.

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Partior served as the project's technical partner, responsible for developing, integrating and testing the Synchronisation Operator prototype used in the experiment.

The project also benefited from the contributions and support of colleagues across the participating and observer central banks, including specialists in payment operations, technology, policy, legal analysis, regulatory oversight and communications.

1. Synchronisation co-ordinates transfers in separate systems so that all linked transfers occur together, or none do. In this trial, a Synchronisation Operator (SO) facilitated this process by exchanging information with participating infrastructures and ensuring that agreed conditions are met before settlement proceeds.
2. By 'atomic settlement', we mean an all-or-nothing outcome across the linked payment legs.
3. Bank for International Settlements (2026), **Uncovering FX settlement risk: new measures from the 2025 BIS Triennial Survey**.