

Synchronisation

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Synchronisation: introduction

Preserving and enhancing the usefulness of central bank money is at the heart of our work to enable safe innovation in money and payments. Synchronisation helps by enhancing the UK's renewed core ledger and settlement engine (RT2) to support atomic settlement in central bank money: allowing the controlled movement of funds between RT2 accounts, conditional upon movements of assets on external ledgers.

We are working with the payments industry to design a new RT2 synchronisation capability and prepare an ecosystem of firms that could provide innovative synchronisation services. We are launching a [Synchronisation Lab](#) for industry to demonstrate synchronisation use cases and understand business models, which will run during 2026 and help us progress towards delivery of an RT2 synchronisation capability into production. In October, we invited organisations to [submit expressions of interest for the Synchronisation Lab](#).

The concept of atomic settlement in central-bank money

However the payments landscape evolves and wherever a transaction takes place, users of payment services want settlement to be as safe, cheap and fast as possible. Users face the risk that one of them fails to hand over ownership of an asset. Mitigating this risk is top of mind in many markets, eg in a foreign-exchange transaction, or a repo collateralised by a tokenised bond, or in a housing transaction.

Conditionality mitigates settlement risk, by linking the exchange of assets such that transfer of one asset occurs if and only if transfer of the other asset (or group of assets) occurs. This is the concept of 'atomic settlement': either all transacting parties successfully exchange assets, or no transfer takes place.

Combining atomic settlement with settlement in sterling central bank money confers additional benefits, as explained in our [Approach to innovation in money and payments](#). Central bank money is the ultimate risk-free settlement asset; and the most liquid and widely accepted settlement asset in the UK economy, in the form of reserves held by financial institutions with us.

Our renewed [Real-Time Gross Settlement service](#) (RT2) is the existing infrastructure for settlement in central bank money. RT2 provides eligible financial institutions with access to efficient and resilient settlement services at scale. It already supports Payment versus Payment (PvP) and Delivery versus Payment (DvP) settlement in sterling central bank money, but RT2 needs additional functionality to widen adoption of PvP and DvP mechanisms and expand the benefits of atomic settlement in sterling central bank money.

Among options available for ensuring that central bank money keeps pace with users' demand for efficient and resilient settlement services, a relatively fast-to-market route involves enhancing RT2 to facilitate its interoperability with other asset ledgers and Financial Market Infrastructures (FMIs) – both existing and new. Industry asked us to prioritise this in their [responses to the 2022 consultation](#) on the Roadmap for RTGS beyond 2024. We are now developing a new synchronisation capability in RT2 to achieve it.

What is synchronisation?

Synchronisation is the orchestration of movements of central bank money between the accounts held in RT2, with the transfer of assets or funds on one or more external asset ledgers.

Synchronisation involves a two-stage 'earmark' and 'release' process. In the first stage, placing an earmark reserves assets on an asset ledger, or funds in the RT2 account. Once earmarked, funds and assets are 'locked' and cannot be used in other transactions. In the second stage, once conditions are met, releasing an earmark initiates the transfer of locked funds and assets to settle the transaction atomically.

How could synchronisation be useful

Transactions involving multiple asset ledgers and transfers can be costly, complex and slow. The longer a transaction takes to complete, the more settlement and price risk may accumulate. Frictions between the exchange of assets and the movement of central bank money – as well as fragmentation of liquidity across venues where assets are traded – create particular challenges in innovative contexts, eg for transactions involving tokenised assets recorded on programmable platforms.

Organisations have told us that synchronisation could both improve existing settlement processes and provide settlement solutions for emerging and new use cases. Examples include settlement of foreign exchange, digital securities, and housing transactions.

Synchronisation is one of several mutually supportive initiatives we are pursuing, where the collective benefits for users should be more than the sum of their parts. Synchronisation is one of the priority features of the wider [Future Roadmap for RTGS](#). And synchronisation could interest firms in the Bank's [Digital Securities Sandbox](#) (DSS), which facilitates innovation in the issuance, trading and settlement of securities in the UK. Synchronisation could provide a route for DSS firms to settle digital-security transactions in sterling central bank money.

How would synchronisation work?

Synchronisation requires two new things:

- the emergence of third-party 'synchronisation operators' – a type of FMI that orchestrates synchronised transactions by connecting key actors; and
- an RT2 synchronisation capability designed and provided by the Bank, which would include an interface to connect synchronisation operators with RT2.

Synchronisation operators would arrange for transfers of money and other assets by co-ordinating the flow of information between the main parties involved in a synchronised transaction. These are: end-customers or their agents; RTGS account holders; and RT2 and external asset ledgers. For a summary of their respective roles, see Table A below. For a stylised diagram of the ecosystem around a synchronisation operator, see Figure 1 below.

The synchronisation operator would not itself hold central bank money and would not itself need an RTGS account to act as a synchronisation operator. Synchronisation operators would check availability and ownership of funds and assets to be exchanged; and instruct RT2 and operators of other asset ledgers to place and release earmarks once all relevant parties confirm. They would need to track and update the status of each leg of a synchronised transaction; and to exchange standardised information securely and efficiently with end-customers, RTGS account holders, and asset ledgers. They would also need to govern roles, responsibilities and dispute-resolution mechanisms among transacting parties. For more on roles and responsibilities in a synchronised transaction, refer to Annex: Roles in a synchronised transaction.

The RT2 synchronisation capability allows synchronisation operators and RTGS to exchange the information needed to place and release earmarks in RT2. Synchronisation operators in different asset markets would connect to RT2 using the same interface. The interface would be simple, with the substance and format of information-exchange aligned as closely as possible to ISO 20022 standards. It would leverage the enhanced capabilities of our renewed RTGS service

Elements of this approach to synchronisation already exist in some jurisdictions, eg in [Australia for settling property transactions](#) ; and in [Switzerland where third parties can trigger movements between accounts in the Swiss RTGS service](#) . Our approach goes further, combining useful elements of existing functionalities to leverage private-sector innovation and meet the needs of UK market participants.

What are we doing to design and deliver synchronisation, and what's next?

Since consulting industry in 2023, we have used controlled experimentation, co-creation with industry, and ongoing policy and design work to progress synchronisation.

We will go further in 2026 by launching a Synchronisation Lab: a realistic setting in which prospective synchronisation operators can demonstrate the value they could offer to industry, and we can explore what to refine and progress on the path towards delivering an RT2 synchronisation capability into production as soon as possible.

To learn more about the Synchronisation Lab and how to participate, refer to [Synchronisation Lab](#) and [Synchronisation Lab – terms of participation](#).

Co-creation with industry

We have sought to bring together the expertise of prospective synchronisation operators, RTGS account holders, and potential end-customers to shape a synchronisation service that delivers for industry. We're ensuring that our industry engagement evolves with the project's needs, which now focus on refining the RTGS capability design, transitioning towards delivery, and readying the ecosystem around prospective synchronisation operators. If you are interested in engaging with us on co-creation, please contact  RTGSRoadmap@bankofengland.co.uk.

Experimentation

In collaboration with the BIS Innovation Hub's London centre, the Bank is running the Project Meridian series of experiments to demonstrate synchronisation's technical feasibility for different use cases. The Synchronisation Lab will build on Meridian by testing key design options for an RT2 synchronisation capability; and by providing a venue for hands-on experimentation by multiple synchronisation operators, for various promising use cases.

- For housing transactions, [Project Meridian \(2023\)](#) ) demonstrated synchronised

settlement between an RTGS service and a digital land registry.

- For PvP settlement in foreign exchange, [Project Meridian FX \(2025\)](#)  demonstrated the technical feasibility of interfacing RT2 with Eurosystem ledgers, including ones based on DLT, to synchronise settlement of sterling-euro payments.
- For tokenised-security transactions, the Bank is currently running experiments to demonstrate the technical feasibility of DvP settlement in central bank money. We expect to publish a report by the end of 2025.

Policy and design

Our work has focused on clarifying relationships between the parties to a synchronised transaction; protocols and channels for exchanging information between synchronisation operators and RT2; assurance requirements for synchronisation operators as future RTGS participants; and with relevant UK authorities, considering how synchronisation operators might need to be regulated and supervised, commensurate with risks they might pose to UK authorities' objectives. This work continues; and we are also determining how the RTGS tariff will capture synchronisation services.

Roles in a synchronised transaction

Table A: Roles in a synchronised transaction

	Synchronisation operator (SO)	RT2	External asset ledger	RTGS account holder	End-customers
What?	Third party that connects to RTGS synchronisation capability	Accounting system that records RTGS account holders' sterling central bank money balances	Ledger recording ownership of the other asset(s) in a synchronised transaction	Organisation that holds an account in RTGS	Ultimate users wanting to conduct a synchronised transaction
Access for the SO	n.a.	Granted by the Bank, subject to the SO's compliance with stated policies	Granted by the ledger operator, subject to SO's compliance with the operator's stated policies	Decides which SO can instruct and release earmarks on its RTGS account	Decides which SO can act on their behalf, and for which transaction types
Earmarks	Can ask to place, release or cancel an earmark of funds in an RTGS account	Implements the SO's request, subject to stated policies	Implements the SO's request, subject to stated policies	Can control/ limit value of earmarks placed on its RTGS account Cannot cancel an earmark once placed	Their bank or other payment service provider would debit or place earmark on their balance as required to ensure funds availability for synchronised settlement

Figure 1 below provides a stylised view of the key interactions required between the various organisations for synchronised settlement in central bank money. Details of the flows will vary with the specifics of a use case.

Additional interactions would be required between synchronisation operators and RTGS account holders as well as asset ledgers, to make necessary updates to end-customers' accounts and asset ownership records. Additional interactions would also be required between RTGS account holders and end-customers.

Figure 1: The synchronisation model – a simplified view

