

Update on the work of the digital euro scheme's Rulebook Development Group

5 September 2024

1 Executive summary

On 18 October 2023 the Governing Council of the European Central Bank (ECB) approved the launch of a two-year preparation phase, laying the foundations for the potential issuance of a digital euro.¹ One of the key deliverables of the preparation phase is a draft digital euro scheme rulebook, which is developed together with the digital euro scheme's Rulebook Development Group (RDG). The ECB frequently provides updates on the work of the RDG and by doing so ensures a high level of transparency.² In this context, this report provides information about the activities of the RDG since the last update on its work, which was published in January 2024.³

A digital euro would be central bank money in digital form, issued by the Eurosystem as a means of payment for use by consumers and businesses in retail transactions across the entire euro area.⁴ A digital euro would be free for basic use, available both online and offline and designed to offer the highest level of privacy.

The rulebook will provide a single set of rules, standards and procedures to standardise digital euro payments and ensure that users' experience and perception of a digital euro would be the same across the entire euro area. The rulebook is being prepared with the RDG, which was established in 2023 and comprises senior representatives of associations of consumers, retailers and payment service providers (PSPs) as well as representatives of national central banks. All members are experts on the payments ecosystem. Representatives from the European Commission, the Presidency of the Council of the European Union and the European Parliament are invited to RDG meetings.

In 2024 the work of the RDG followed two main streams of activity. In one stream, the RDG reviewed the first draft of the intermediate version of the rulebook as it stood at the beginning of the year. In the other, the RDG continued drafting additional sections of the rulebook and developed existing ones further.

¹ A possible decision by the ECB's Governing Council to issue a digital euro would only be taken once the digital euro legislation has been adopted.

² For information about the RDG, see the "[Digital euro scheme rulebook](#)" section of the ECB's website.

³ For the update on the work of the digital euro scheme's RDG, see the MIP News item of 3 January 2024 entitled "[Second update on the work of the digital euro scheme's Rulebook Development Group](#)" on the ECB's website.

⁴ For more information, see the "[Digital euro](#)" section of the ECB's website.

First, as part of the rulebook development process, the RDG reviewed the first draft of the intermediate version of the rulebook as it stood at the beginning of the year.

The ECB reported on this first draft of the intermediate version of the rulebook in the “Second update on the work of the digital euro scheme’s RDG” in January 2024. The intermediate version of the rulebook was drafted in line with digital euro design decisions approved by the Governing Council of the ECB and with the legislative proposal for a digital euro.^{5,6} Although the RDG had been involved in drafting the intermediate version of the rulebook, it was also invited to review the version to (i) ensure that the RDG members had sufficient time to involve their respective stakeholder associations in the review, and (ii) go over the draft rulebook in its entirety.

The first intermediate draft of the rulebook was developed with RDG workstreams and made available at the beginning of 2024. It included drafts of several core chapters.

One of the chapters outlined the scope of the digital euro scheme as well as the key actors involved and their interplay. It also contained a first draft of the functional and operational model, including end-to-end flows describing the functioning of all use cases and services within the scope of a digital euro. Lastly, the first draft included technical scheme requirements, depicting the high-level architecture of a digital euro and including proposals on which current market standards could potentially also be used for a digital euro. Upon review by the RDG (and the stakeholders the group represents) the comments were assessed and will be addressed in a revised version of the rulebook. At the time of the review, RDG members were also invited to share their views on the possible opportunities and challenges associated with a digital euro (see Section 3).

Second, the RDG continued working on additional sections of the rulebook that were not covered in the first intermediate draft and developed existing sections further.

These activities were often carried out with the support of the RDG workstreams, which are composed of experts from the payments market nominated by the RDG members. In 2024 several new RDG workstreams were established; these covered minimum user experience standards (UX) as part of the functional and operational model, the certification and approval framework and risk management. Four workstreams covered implementation specifications for different domains of interaction between digital euro ecosystem parties. In addition, the RDG provided input into areas of relevance for the rulebook, such as the ECB’s exploration into the offline functionality of a digital euro and technical analysis of multiple digital euro accounts per user. The RDG also further advanced analysing existing standards that the digital euro could build on, while other sections were started, covering, for example, fraud risk management (see Section 4).

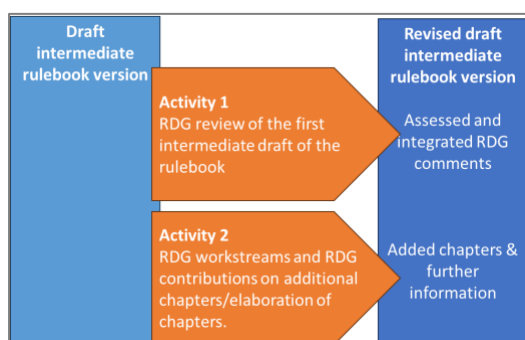
⁵ See “A stocktake on the digital euro – Summary report on the investigation phase and outlook on the next phase”, ECB, October 2023.

⁶ See Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro, European Commission, COM(2023) 369 final, 28 June 2023; and Proposal for a Regulation of the European Parliament and of the Council on the provision of digital euro services by payment services providers incorporated in Member States whose currency is not the euro and amending Regulation (EU) 2021/1230 of the European Parliament and the Council, COM(2023) 368 final, 28 June 2023.

As outlined in this report, the work of the RDG will feed into a new draft of the rulebook that will reflect the comments received from the RDG on the first intermediate draft and be supplemented with the RDG’s work on additional sections and further development of existing sections. The resulting new draft version will be finalised in the course of the digital euro preparation phase. In the first quarter of 2025 a new progress report on the work of the RDG will be shared.

The draft rulebook will be sufficiently flexible to accommodate any future adjustments deriving from the digital euro legislative process.

Figure 1
RDG activity streams



2 Introduction

On 18 October 2023 the Governing Council of the ECB approved the launch of a two-year preparation phase, laying the foundations for the potential issuance of a digital euro.⁷ One of the key deliverables of the preparation phase is to prepare a draft digital euro scheme rulebook. The rulebook consists of a single set of rules, standards and procedures to standardise digital euro payments across the euro area. Thanks to this harmonisation, users’ experience and perception of a digital euro would be the same across the entire euro area, irrespective of the PSP used or the country in which the payment was made – just as it is for euro cash today.

A digital euro would be central bank money in digital form, issued by the Eurosystem as a means of payment for use by consumers and businesses in retail transactions across the entire euro area.⁸ A digital euro would be free for basic use, available both online and offline, and designed to offer the highest level of privacy. It would allow users to instantly settle payments in use cases prioritised by the Eurosystem, whether those payments were person-to-person, at the point of sale, in e-commerce or from/to public authorities. No digital payment instrument currently offers all these features, and a digital euro would fill that gap. A digital euro would be distributed by PSPs such as banks. It would complement, but not replace,

⁷ A possible decision by the ECB’s Governing Council to issue a digital euro would only be taken once the digital euro legislation has been adopted.

⁸ For more information, see the “Digital euro” section of the ECB’s website.

cash (euro banknotes and euro coins), offering more freedom of choice by providing a secure and accessible payment solution.

The draft digital euro rulebook is being developed with the digital euro scheme’s Rulebook Development Group (RDG). The RDG was established in January 2023 and its members are senior professionals nominated by associations involved in retail payments. Representatives from associations of consumers, retailers and PSPs cover both the supply and the demand sides of the retail payment industry. In addition, representatives of the national central banks, the European Commission, the Presidency of the Council of the European Union and the European Parliament are invited to RDG meetings. The Governing Council of the ECB ultimately decides on the adoption of the initial digital euro rulebook.

The rulebook builds on the current design choices made by the Governing Council of the ECB and will be fully in line with the digital euro regulation.⁹ The draft rulebook will be flexible enough to accommodate any future adjustment deriving from the legislative discussion on the basis of the digital euro regulation proposed by the European Commission in June 2023.¹⁰ Moreover, the Eurosystem is committed to drawing from and building on existing standards and scheme solutions as much as possible to create synergies and limit implementation costs – all the while preserving the Eurosystem’s freedom of choice when it comes to further developing a digital euro. The work of the RDG is supported by its dedicated workstreams, which focus on specific topics that require particular expertise.¹¹ The next version of the rulebook is expected to cover the topics set out in the draft table of contents below (Figure 2).

Figure 2
Envisaged list of content of the draft rulebook

Envisaged content of the new draft interim rulebook	
1	Document information ^a
2	Digital euro scheme scope and interplay ^a
3	Functional and operational model ^a
	a. High-level end-to-end flows ^a
	b. Identification and authentication ^a
	c. Minimum UX standards ^b
	d. Dispute management ^b
4	Adherence model ^a
5	Technical scheme requirements ^a
	- Interface standards and specifications ^c
6	Risk management ^b
7	Scheme management ^c
8	Defined terms and abbreviations ^a
Annexes	
	- User journeys ^a , Detailed end-to end flows ^a , Branding standards ^b , scheme compatibility and interoperability ^c
	- Detailed technical specifications ^c , implementation guidelines ^b , certification related documentation ^b
	- FAQ ^a
^a RDG review of draft interim rulebook ^b Current RDG work ^c Future RDG work	

⁹ See “A stocktake on the digital euro – Summary report on the investigation phase and outlook on the next phase”, ECB, October 2023.

¹⁰ See Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro, COM (2023) 369 final, 28 June 2023.

¹¹ The RDG is supported in developing the rulebook by several dedicated workstreams, each of which reports directly to the RDG. Members of the RDG nominate participants for these workstreams, ensuring a collaborative and coordinated effort. Workstream participants were selected through a formal application process: see the “Governance and stakeholder engagement” section of the ECB’s website.

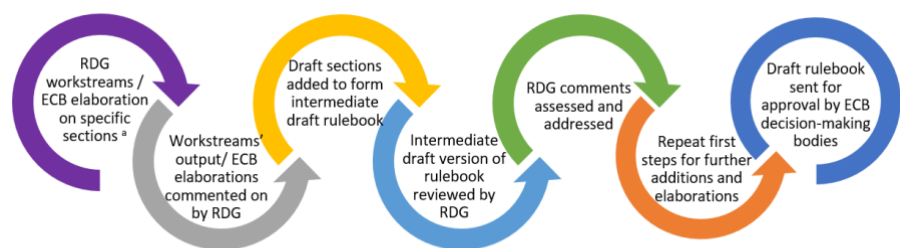
This report is part of the ECB’s regular updates on the RDG’s progress, reflecting its commitment to ensuring that the digital euro project adheres to the principle of transparency.¹² The ECB published its previous update on the RDG’s work in January 2024. This report sets out the two main activity streams of the RDG in 2024: (i) the review of the first draft version of the rulebook, and (ii) work on additional chapters and further development of existing chapters.

As reported in the January update on the work of the RDG, the intermediate draft of the rulebook (as it stood at the beginning of 2024) was reviewed in its entirety by the RDG members over the first quarter of 2024. As the RDG members had been involved in the preparation of the various sections of the first draft of the rulebook over the course of 2023 through separate workstreams (see Figure 3), the group was invited to review the intermediate version to (i) ensure that the RDG members had sufficient time to review the draft together with the respective stakeholder associations they represent, and (ii) review the draft rulebook in its entirety. The insights from the interim review have been instrumental in the process of refining various sections of the rulebook.

In addition, the RDG continued work on additional chapters and developed existing chapters further. To achieve this, in May 2024 the RDG created seven new workstreams with participants from within the payments industry and outside it, nominated by RDG members and central bank representatives. These workstreams cover minimum user experience standards, certification and testing and risk management; four of them cover implementation specifications. In addition, the RDG provided comments on the ECB’s work on the offline functionality of a digital euro and technical analysis of multiple digital euro accounts per user.

Figure 3

RDG work process on the intermediate draft version of the rulebook



^a The rulebook builds on the current design choices made by the Governing Council of the ECB.

¹² In addition, the agenda and the minutes of the RDG meetings are regularly shared on the “Technical documents and research” section of the ECB’s website.

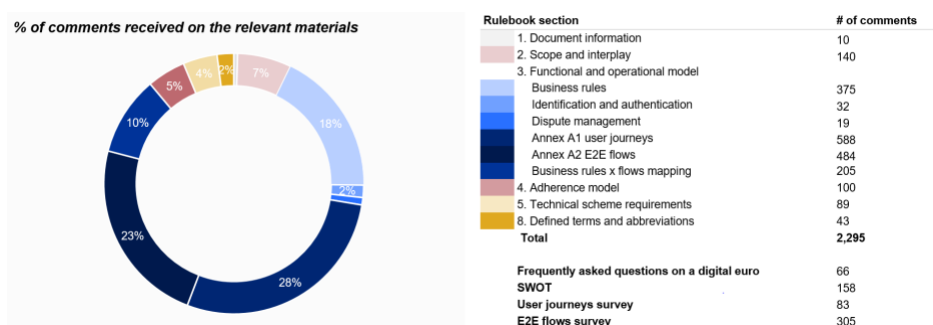
RDG review of the intermediate draft rulebook

In the first quarter of 2024, as part of the rulebook development process, RDG members (and members of the associations they represent) conducted a review of the first draft version of the rulebook and provided feedback. This interim review was an opportunity for the stakeholders to thoroughly review the draft rulebook in its entirety, RDG members having been involved in drafting different sections of the rulebook over the course of 2023. RDG members were also invited to share their views on the opportunities and potential challenges of a digital euro.

RDG members submitted close to 2,500 comments aimed at further improving the content of the draft rulebook. Figure 4 shows an overview of the comments received on each section of the rulebook. The high level of engagement demonstrated, and the detailed, constructive feedback provided during the review process have been invaluable, given the RDG members' unique expertise in retail payments and the various perspectives (associations of consumers, retailers and PSPs) represented in the RDG.

Figure 4

Overview of comments received per section

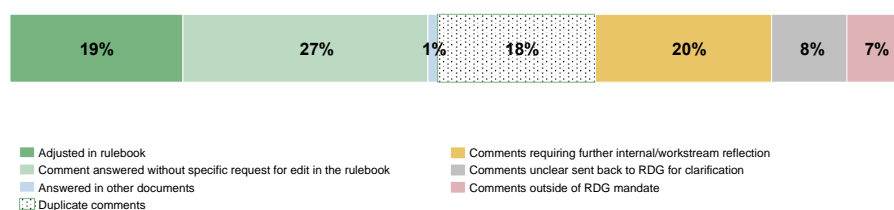


All comments were carefully assessed and reviewed. Figure 5 provides an overview of how the comments received were followed up on. About one-fifth of the comments (those in the “Adjusted in rulebook” category) will be directly addressed through updates to specific sections of the rulebook. Comments by RDG members that did not explicitly call for rulebook edits (“Answered without specific request for edit in the rulebook”, about a quarter of all comments) were taken as an opportunity to engage with RDG members to provide clarifications. About one-fifth of the comments (“Comments requiring further internal/workstream reflection”) have implications that require additional consideration and technical work. This work will either be included in the relevant RDG workstreams or reported back directly to the RDG after further consideration. The remaining comments were categorised as either “Duplicate comments”, “Comments unclear” (replies to these will be given following additional clarifications from RDG members) or “Answered in other documents” (where clarification is provided in documents other than the draft version of the rulebook, such as the draft legislation). Lastly, 7% of the comments fell outside the scope of the RDG’s mandate, such as those related to digital euro business models or design choices. Comments that are not within the RDG’s mandate and

require follow-up will be brought to the attention of other fora.¹³ To make sure the handling of each single RDG comment is fully transparent, the ECB has provided a “traceability matrix” for use by the RDG members.

RDG members also provided comments on the section entitled “Defined terms and abbreviations”. These will be taken on board; however, it should be noted that the section on defined terms and abbreviations will remain in flux, because these definitions may also depend on the definitions given in the draft digital euro legislation and on the further development of the rulebook.

Figure 5
Summary of comments received and corresponding responses



3.1 Updates to the draft rulebook as a result of the RDG review

This chapter explains how comments provided by the RDG members on each section of the draft intermediate rulebook have been processed and how they will be reflected in a future draft version of the digital euro rulebook.

3.1.1 Review of Section 2: Scheme scope and interplay

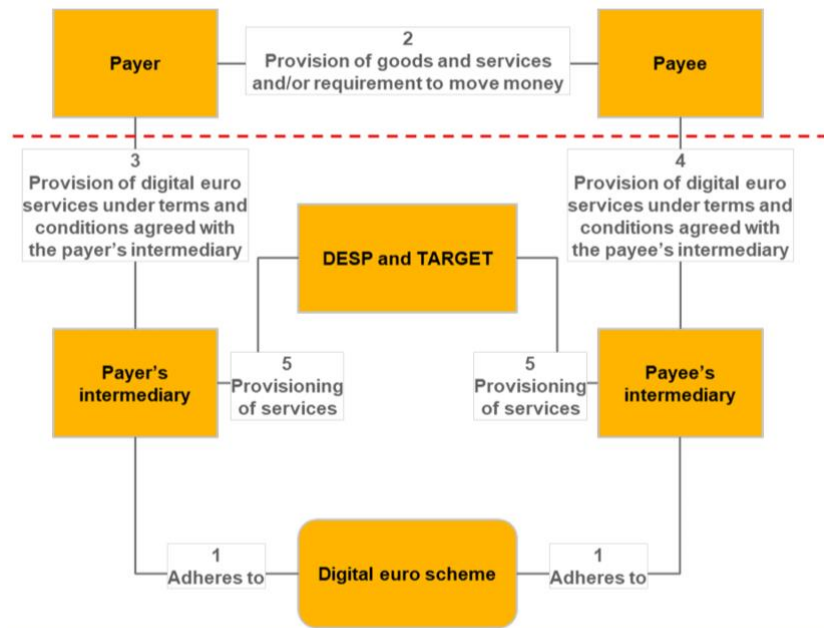
RDG members provided approximately 140 comments on Section 2 of the rulebook, which outlines the scope of the digital euro scheme. Section 2 includes the scope of the rulebook provisions, the key actors in the scheme and their relationships (see Figure 6), and the services covered by the scheme. Figure 7 below provides an overview of the comments received on Section 2 and the corresponding follow-up actions. The RDG concurred to the draft on key actors and their relationships as well as the services covered. Based on the comments received, several changes will be made to increase clarity. For instance, the initial reference to intermediaries will be refined to include the definition of supervised PSPs, government payments will be included with other payments within the scope of the scheme, and the applicable roles of PSPs in light of their participation in the scheme will be set out in detail.¹⁴ RDG members also provided feedback on the draft adherence model (Section 4 of the rulebook). In that section, the roles of the main

¹³ Other fora include the Euro Retail Payments Board, the European Data Protection Authorities and the European Economic and Social Committee; see the “Governance and stakeholder engagement” section of the ECB’s website.

¹⁴ The section remains dependent on, and will be fully aligned with, the digital euro regulation.

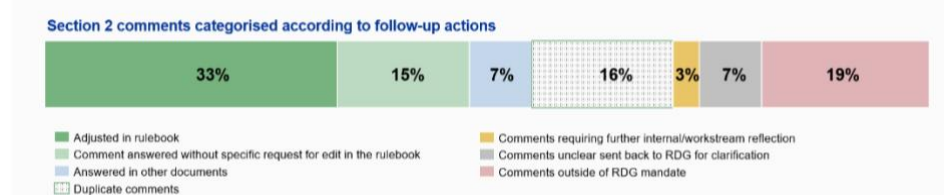
actors in the scheme will be updated and more light will be shed on relevant existing EU regulations.

Figure 6
Relationships with the digital euro ecosystem



Note: Intermediaries may engage third-party entities as agents or subcontractors to support them in the provision of services they are obliged to provide under the scheme, while retaining full accountability. From a contractual point of view, such third-party entities would not be actors in the scheme.

Figure 7
Summary of comments received on Section 2 of the rulebook and corresponding follow-up actions

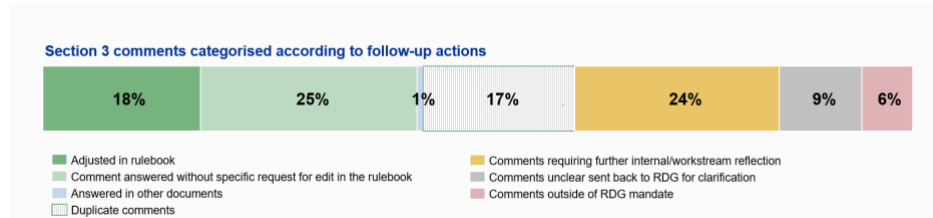


3.1.2 Review of Section 3: Functional and operational model

RDG members provided more than 1,500 comments on Section 3, which defines the functional and operational model of different services within the scope of the digital euro scheme. Most comments applied to user journeys, end-to-end flows and business rules. See Figure 8 for an overview of the comments received and the corresponding follow-up actions.

Figure 8

Summary of comments received on Section 3 of the rulebook and corresponding follow-up actions



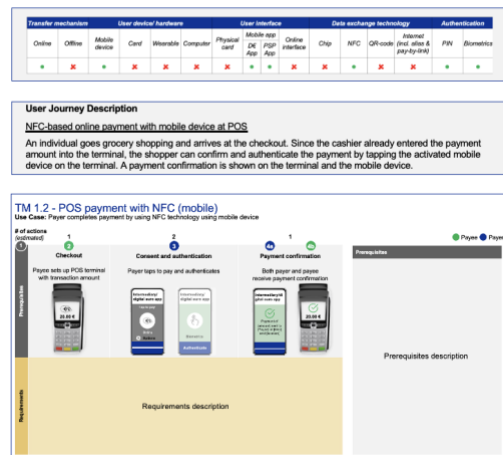
Note: Comments still under review by the digital euro programme are excluded from this overview.

Following comments by RDG members, specific updates to the user journeys will be included.¹⁵ In its review, the RDG concurred to the user journeys shown in the intermediate draft but also asked for further details to be added. These further details will be included, and additional user journeys will also be incorporated. Examples of additional journeys are a DEAN-based e-commerce payment, a user journey tailored to in-branch transactions, as well as an integrity check for offline funds. Based on the review comments, the depiction of the user journeys will be improved. For each user journey the draft description will be preceded by a table that shows the transfer mechanisms, user devices/hardware, user interfaces, data exchange technologies and authentication methods affected (please see Figure 9 below for an example of a revised user journey, based on the example of a digital euro point-of-sale (POS) payment with a mobile device using near field communication (NFC)). Furthermore, clearer mapping of the user journeys to online use cases, offline use cases, and both online and offline cases was provided.

Figure 9

New user journey format

New structure - each user journey now contains a table, a description and a visualisation



- **Table** highlighting the transfer mechanism, user devices/hardware, user interfaces, data exchange, technologies and authentication methods affected.
- **User journey** description form the end-user product description (EUPD) research.
- **“Old” visualisation** of each user journey, which includes steps, requirements and prerequisites.

¹⁵ A user journey describes the experience and sequence of steps a user goes through when making a payment or during another process related to a digital euro (e.g. funding or onboarding). It encompasses interactions, touchpoints and processes from the user’s perspective.

Further updates to end-to-end flows¹⁶ are envisaged as a result of the approximately 530 comments received by RDG members. Based on the comments received, end-to-end flows that show the flows across all participants in the digital euro-related process were further developed and new end-to-end flows will be added (for instance, end-to-end flows for offline use cases that were initially combined with those of online use cases. This also ensures alignment with the changes to user journeys mentioned above). In addition, some end-to-end flows will be modified; for instance, some initially envisaged sequences will be optimised, while other end-to-end flows will be streamlined by removing and/or adding steps as necessary. Finally, clarifications will be added to the descriptions of certain steps in the flows.

Altogether, the RDG members provided a total of approximately 330 comments on business rules¹⁷. Parts of this section will be updated on the basis of these comments. The updates involve adding new business rules, moving some rules to more specific sections of the rulebook, as well as clustering business rules in order to specify whether they are generic to all use cases or specific to some. Moreover, the rule descriptions will be refined for ease of reading.

3.1.3 Review of Section 5: Technical scheme requirements

Comments on the section dealing with technical scheme requirements concerned the addition of definitions of digital euro service platform (DESP) interfaces, references to applicable standards and the definition of detailed specifications. As a result, DESP interfaces are being addressed by a specific workstream (C1 Sprint 4), which is also providing a holistic view of high-level functional architecture and the introduction of specific DESP services. The implementation specifications and references to standards will be provided in the respective rulebook implementation specification annexes when the G workstreams have completed their work.

3.2 RDG views on strategic opportunities and potential challenges of a digital euro.

The interim review also provided an opportunity to gather RDG insights on the opportunities and challenges they associate with a digital euro. Such open feedback from experienced market professionals and stakeholders constitutes important input for the Eurosystem, even though the collection of such input is not one of the RDG's official deliverables. The points raised by RDG members are based on their assessment of the project in its current phase. The RDG feedback

¹⁶ An end-to-end flow describes a payment process or other process related to a digital euro (e.g. funding or onboarding) from initiation to completion. This description includes all intermediary steps and entities involved in the process.

¹⁷ A business rule provides a more detailed description of rulebook participants' responsibilities, which goes alongside the description of responsibilities in the adherence model. The business rules take the form of instructions (specifying what participants must do, either in general or when specific conditions are met) and constraints (specifying what is not possible or allowed under the rulebook).

was reflected on at the RDG meeting on 11 June 2024, with a focus on whether the mitigation measures already envisaged could address the possible challenges referred to. In addition, the feedback was shared at a [dedicated Euro Retail Payments Board \(ERPB\) technical session on a digital euro](#) on 16 July 2024. This section includes a brief description of the RDG’s feedback and outlines the ECB’s potential strategies for mitigating the possible challenges mentioned.

3.2.1 RDG feedback on strategic opportunities

The RDG’s views on the broader strategic opportunities associated with a digital euro can be summarised in six key areas, as outlined in Figure 10 below and briefly summarised in the text that follows.

Figure 10
Strategic opportunities of a digital euro



- European, comprehensive and inclusive:** A digital euro has the potential to establish a comprehensive payment method that is usable across the entire euro area, covering a wide range of use cases (POS, peer-to-peer and e-commerce transactions, for example) and functionalities that add value for end users. Such value is reflected in distinctive features such as pan-European coverage, inclusivity, a high level of privacy, free basic use and offline functionality.¹⁸ Currently there is no European payment solution that covers as many use cases as a digital euro would.
- Public good:** A digital euro would be central bank money issued by a public institution, the ECB. It could bring resilience to the digital payments market and would be a trusted and secure payment method supported by the Eurosystem. While a digital euro would be a public good, engaging continuously and intensively with multiple private stakeholders would also be important. A digital euro would further protect sovereignty and strategic autonomy by offering central bank money for retail payments that is available to everyone across the euro area. A digital euro would reduce dependence on non-European players, boost competition and increase the competitiveness of the European payments market.

¹⁸ For more information, see the keynote speech entitled "[Innovation, integration and independence: taking the Single Euro Payments Area to the next level](#)", given by Piero Cipollone, Member of the Executive Board of the ECB, at the ECB conference on "An innovative and integrated European retail payments market" on 24 April 2024.

- **Innovation and value-added services:** A digital euro has the potential to meet the growing demand for digital payments and provide a platform for innovation. Services developed by market participants could benefit from the European reach of the digital euro. The digital euro rulebook will support standardisation, which would allow PSPs to offer their own payment services throughout the euro area. A digital euro would also have an offline functionality. An offline digital euro would be able to provide a level of privacy close to that of cash, and would contribute to the resilience of digital payments.
- **Privacy:** A digital euro has the potential to offer high privacy standards for both offline and online payments. With the offline digital euro, people would be able to enjoy a privacy level similar to that of cash, because for offline transactions personal transaction details would only be known to the payer and the payee (as is the case for cash payments). For online digital euro payments, the Eurosystem, as payment infrastructure provider, would not be able to directly link transactions to specific individuals.
- **Reusability, interoperability and synergies:** A digital euro has the potential to make use of existing European standards while creating new ones that can benefit Europe in other areas besides payments. The design of a digital euro would aim at interoperability with European payment solutions. Digital euro onboarding processes would be streamlined by making use of PSPs' existing know-your-customer (KYC) procedures. In the future, there would also be potential for interoperability with other central bank digital currencies issued by other jurisdictions.
- **Strengthen competition and competitiveness:** A digital euro has the potential to strengthen competition on a European scale, as it would allow PSPs to offer payment solutions throughout the euro area on the basis of a single infrastructure. This would reduce our current dependence on non-European payment solutions. A digital euro could lead to lower payment acceptance fees and provide greater price transparency regarding payment costs. The absence of scheme fees could also help lower the overall level of fees. In turn, this could result in lower costs for merchants and benefit consumers.

3.2.2 RDG feedback on potential challenges and envisaged mitigation measures

RDG members were also invited to provide feedback on the potential challenges that should be considered in the context of the digital euro project.

These were discussed at the RDG meeting on 11 June 2024 and at the [dedicated Euro Retail Payments Board \(ERPB\) technical session on a digital euro](#) on 16 July 2024. At these meetings, existing and additional mitigation measures were discussed.

- **Communication regarding consumer benefits:** Some RDG members stressed the importance of communication regarding the benefits of the project

for end users in order to avoid low adoption levels upon a possible digital euro's launch.

Mitigation: During the preparation phase, the Eurosystem is stepping up its digital euro-related communications, focusing on raising awareness and understanding of a potential digital euro among the general public. Furthermore, it is well understood that if a digital euro would be issued, more dedicated communication efforts will be needed. These communications will need to be close to the time of issuance to be effective. However, initial plans for this are already being made as part of the preparation phase.

- **Privacy:** While the privacy offered by a digital euro was mentioned as a strategic opportunity, some RDG members drew attention to a risk of misperceptions regarding privacy and fears over citizen surveillance.

Mitigation: The digital euro would be governed by EU regulations adopted by co-legislators and designed to balance privacy with security. For its part, the ECB has actively communicated information on this important matter¹⁹ and has engaged with a wide range of stakeholder groups.²⁰ It remains committed to maintaining these efforts in the future.

- **End-to-end flow latency²¹:** Some RDG members highlighted as a potential challenge the possibility that, unless they were clearly defined, payment processing times could be longer than those of existing payment schemes.

Mitigation: The digital euro's design aims to achieve an end-to-end flow latency that is equal, or lower than, current payment solutions. Therefore, as a follow-up to these concerns, the RDG will be asked to work on this matter in the coming months to establish how this can be achieved.

- **Execution and costs of implementation:** Some RDG members mentioned the wide scope of the digital euro project and highlighted potential challenges regarding PSPs' investment costs for implementation and maintenance.

Mitigation: The ECB has been committed to limiting implementation costs as much as possible. An important element of that is the intention to re-use existing standards and processes as much as possible. The ECB worked together with the RDG to identify potential standards that could be re-used. During the preparation phase, the RDG, and more specifically the implementation specification workstreams, will continue work on this. Moreover, the ECB has prioritised use cases and considered staggered roll-out options.

- **Degree of prescriptiveness:** Some RDG members highlighted as a potential challenge the possibility that prescribed and detailed front-end interactions may

¹⁹ It should be noted privacy has been a central focus of the digital euro project from the start. Please see the "[Digital euro and privacy](#)" section of the ECB's website.

²⁰ This includes dedicated engagement with civil society representatives. One example of this engagement was the [civil society seminar on laying the basis for a digital euro](#), which took place on 8 July 2024.

²¹ "End-to-end flow latency" refers to the time taken from sending a payment request to a PSP to completely finalising a payment.

reduce room for the market to innovate, and raised concerns that the Eurosystem might be using an overly prescriptive approach.

Mitigation: To ensure that a digital euro would be accepted throughout the euro area in a harmonised way, it is necessary to define rules and procedures that include criteria for interactions with payers and payees at the front end. However, the aim is to define minimum user experience standards that give the market sufficient room for innovative solutions that still meet the need for harmonised user experiences. In this current phase, a RDG workstream on minimum UX standards has been launched, with the task of defining the right balance.

- **European payments integration:** Some RDG members were concerned that a digital euro could further fragment the European payments sector, in which large non-European payment and technology firms are now also present.

Mitigation: In the current European landscape, there is no European retail payment solution that would cover the three identified use cases across the whole euro area. The digital euro standards will be defined in the digital euro rulebook and will be implemented across the whole euro area. If a digital euro would be issued it will be open and could be re-used for European payment solutions, for example those based on instant payments. This would create an opportunity for a larger number of pan-European payment solutions, and would reduce the costs of implementation and operation.

- **Resilience:** Some RDG members also mentioned the risk that a digital euro could become a single point of failure, which could in turn inadvertently reduce European resilience.

Mitigation: While the digital euro would exist as an additional payment solution alongside others, it would not become a single point of failure but instead increase resilience by avoiding an excessive dependence on non-European providers. At the same time, a digital euro would, by its design, meet the highest standards of cybersecurity and operational resilience.²² In addition, thanks to the offline features of a digital euro, end users would still be able to pay in the event of online services not being available, for instance in the case of limited network coverage, power outages or network disruptions.

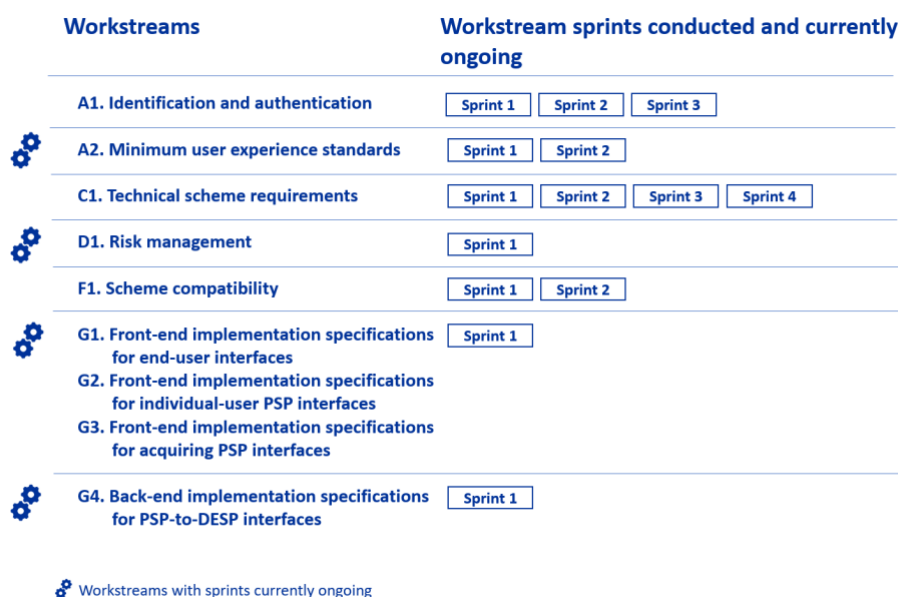
²² On this point, specific requirements have been set as part of the ongoing sourcing process. Please see the MIP News item of 3 January 2024 entitled "[Calls for applications for digital euro component providers](#)" on the ECB's website.

4 RDG progress on new sections and development of existing sections of the draft rulebook

4.1 Report on the progress of the RDG workstreams

As a second main stream of activity, the RDG has continued drafting additional sections of the rulebook and developing existing ones further. This section reports on the status of the workstreams in which rulebook content is being developed in collaboration with the workstream members. Workstreams can consist of several sprints.²³ Figure 11 shows an overview of the workstreams with ongoing sprints and the workstreams with no sprint currently running.²⁴

Figure 11
Workstream overview



4.1.1 Workstream A1: Identification and authentication

Workstream A1 on identification and authentication focused on defining the requirements for the identification and authentication of digital euro end users, aiming to make use of existing practices as much as possible while ensuring the highest standards in terms of digital financial inclusion, user experience and privacy.²⁵ The workstream has carried out three sprints. Sprints one and two

²³ A sprint is a work module in which the workstream focuses on covering a specific theme within a specific timeframe.

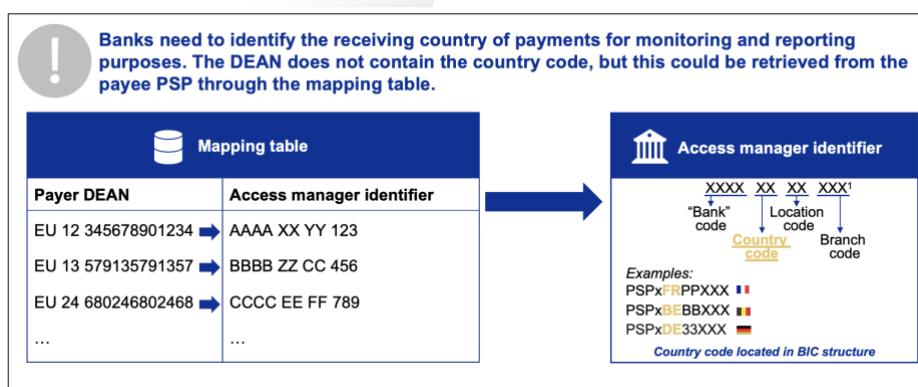
²⁴ For more information on workstreams with no sprints currently running, please see [Section 9.1 of the RDG progress report of January 2024](#).

²⁵ The full [mandate for the launch of workstream A1](#) is available on the ECB's website.

were performed in 2023²⁶, while sprint three was carried out in the first quarter of 2024.

This workstream addressed several aspects of identification and authentication.²⁷ This included defining requirements for PSPs regarding the use of personal identifiers (PIDs) in accordance with the revision of the eIDAS Regulation²⁸ when requesting digital euro account numbers (DEANs) for users, and allowing users to identify themselves with a pseudonymised identity in online payment use cases. In addition, for offline use cases, the workstream recommended that authentication should be conducted locally by the payee’s device. This recommendation will be explored in further detail. One further aspect that was determined is the specific structure of the DEAN. This is intended to be a universal number that is independent of the country of residence of the DEAN holder, i.e. the natural person holding a digital euro account (see Figure 12).

Figure 12
Overview of identification and authentication process











The workstream provided an initial assessment of strong customer authentication (SCA) methods, checking them against accessibility and inclusivity requirements (see Figure 13).

²⁶ For more information, see [Section 9.1 of the RDG progress report of January 2024](#).

²⁷ It should be noted that for online digital euro payments, privacy would be implemented in such a way that the Eurosystem itself – the issuer and payment infrastructure provider – would not be able to directly link transactions to specific individuals. The ECB, with support from market experts and Eurosystem technical experts, has been exploring the technological solutions required to achieve this, including specific measures in the form of pseudonymisation, hashing and encryption of messages exchanged with and between PSPs. In addition, the data exchanged between PSPs and the Eurosystem would be segregated. As a result, the Eurosystem would not be able to directly identify end users or link any of the data it processes to an identified end user. For more information, see [“Progress on the preparation phase of a digital euro – First progress report”](#).

²⁸ [Regulation \(EU\) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC \(OJ L 257, 28.8.2014, p. 73\)](#).

Figure 13
Overview of authentication methods

Mechanism	Requirements						
	European Accessibility Act (EAA)				Payment Services Regulation (PSR)		Computer independent
	Adjustable visual elements (if used)	Adjustable audio elements (if used)	Communications via alternatives sensory modes	No triggering of photosensitive seizures	Suitable for low digital skills	Smartphone independent	
App-based authentication 	✓	✓	✗	✓	✗	✗	✓
OTPs 	✓	✓	✗	✓	(✓)	✓	(✓)
Biometrics (smartphone) 	(✓)	(✓)	(✓)	✓	(✓)	✗	(✓)
Biometrics (external device) 	✗	✗	(✓)	✓	(✓)	✓	(✓)
Card reader / chipTAN device 	✗	✗	(✓)	(✓)	✓	✓	✓
Hardware token 	✗	✗	(✓)	✓	✓	✓	✓
Photo TAN 	✗	✗	(✓)	✓	✓	✓	✓
Software token 	✓	✓	✗	✓	(✓)	✓	(✓)

Note: Indicative assessment only. Definitive assessment depends on exact implementation. ✓ = Yes (✓) = Yes, depending on implementation ✗ = No

4.1.2 Workstream C1: Technical scheme requirements

Workstream C1 on technical scheme requirements was initially focused on developing the technical interfaces in the front-end digital euro space, including the end user’s and PSP’s respective devices, and the digital euro non-functional standards and requirements.²⁹ Three workstream sprints focusing on technical specifications in the front-end digital euro space were conducted in 2023.³⁰ The fourth sprint, focusing on technical specifications in the back-end digital euro space, was carried out in the first quarter of 2024.

This fourth workstream sprint helped to clarify the list of services to be offered by the DESP and provided a draft list of interfaces to be put in place between PSPs and the DESP. While the rulebook will neither cover the internal DESP architecture nor describe the DESP components, it is crucial to have a clear understanding of the services that DESP should offer to PSPs, as well as the interfaces that should be used to deliver these services. In combination with the outcome of the first three front-end-focused workstream sprints, the fourth sprint provided a holistic view of technical digital euro scheme requirements across the ecosystem. The list of DESP services as mapped by this workstream is shown in Table 1 below.

²⁹ The full [mandate for the launch of workstream C1](#) is available on the ECB’s website.

³⁰ For more information, see Section 9.2 of the [RDG progress report of January 2024](#).

Table 1
Overview of DESP services for PSPs

Service	Scope and examples*
Access management services	User and account-specific services which are not payment-related (e.g. user onboarding and management, account switching and payment instrument set-up).
Alias lookup services	Services enabling alias resolution upon initiation of the transaction.
Tokenisation services	Services such as QR code (de)tokenisation, contactless (near-field communication, NFC) payment surrogate generation, and pay-by-link transaction (de)tokenisation.
Settlement services	Payment related functions (e.g. pre-authorisation, (de)funding account-to-account transactions and recurring payment settlement).
Fraud risk management services	Services related to fraud risk management.
Dispute management services	Pre-dispute and dispute-related services.
Data exchange services	Machine-readable bi-directional data exchange services (e.g. scheme configuration parameters distribution and submission of reports and statistics).
Offline digital euro services	A DESP component for intermediary services related to offline digital euro (e.g. request for issuance and redemption of offline digital euro and requests to carry out online integrity checks).

*This list of examples of services between the DESP and PSPs is not exhaustive.

In addition, the fourth workstream sprint identified a first set of data elements requirements for each interface, which will help in assessing the extent to which existing market standards may be re-used for the digital euro scheme.

No further sprints are currently planned for this workstream. The outcome of the workstream serves as the foundation for the G workstreams aimed at providing implementation specifications as described in Section 5.1.6.

4.1.3 Workstream A2: Minimum user experience standards

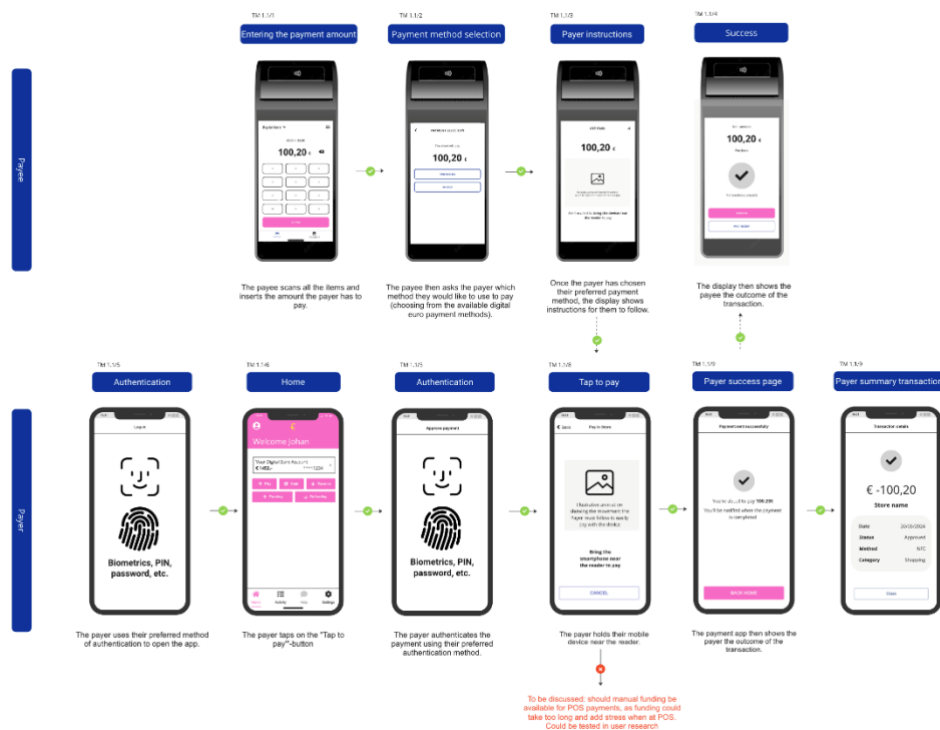
Workstream A2 on minimum user experience has the primary objective of proposing minimum standards and requirements for user experience (UX).³¹

The goal is to achieve a consistent UX across different digital euro use cases, and across jurisdictions independently of the PSPs providing the digital euro services, while allowing PSPs the flexibility to integrate a digital euro into their own user interfaces, minimising the need for strict guidelines in order to leave room for innovation and adaptation of local practices by the private sector. This workstream completed its first sprint in the second quarter of 2024.

During its initial sprint, this workstream developed a set of UX guidelines for various transaction management use cases, including peer-to-peer, POS and e-commerce payments. These detailed guidelines have undergone expert review, incorporating market experience and best practices. Market experts have also utilised an assessment framework to enhance the overall UX for the digital euro, particularly in terms of accessibility and inclusivity. These detailed guidelines will serve as a more comprehensive version of user journeys and should not be considered prescriptive. Instead, they will help identify which aspects and recurring interactions require dedicated minimum UX standards (see Figure 14).

³¹ The full [mandate for the launch of workstream A2](#) is available on the ECB's website.

Figure 14
Example of user journeys developed in the A2 workstream



The workstream will step up its efforts in the coming months. In the upcoming sprint, the workstream will focus on (i) translating additional user journeys into detailed UX guidelines, including liquidity and access management cases, and validating them through expert review; (ii) identifying more recurring interactions and proposing mandatory and optional minimum standards; and (iii) evaluating UX guidelines with a focus on accessibility and inclusivity.

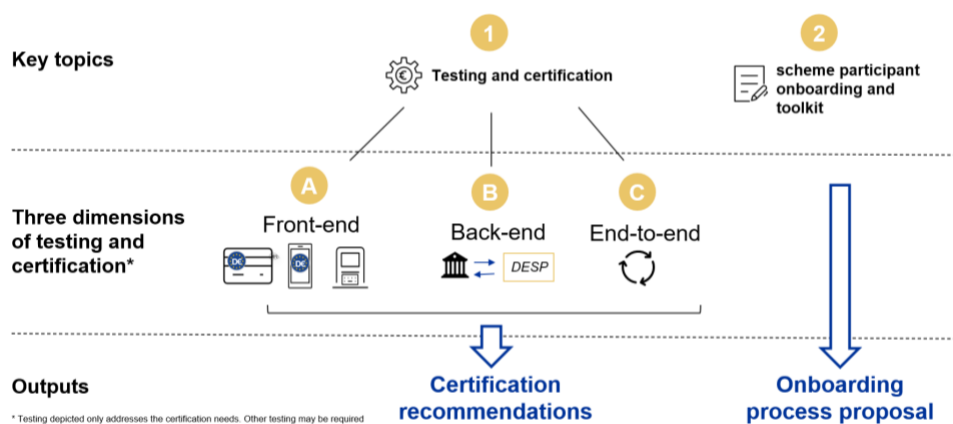
4.1.4 Workstream B1: Certification and approval framework

The goal of workstream B1 is to develop a proposal for the digital euro scheme as regards the applicable certification and approval framework.³² This workstream specifically focuses on front-end elements such as end-user devices and acceptance terminals. The first sprint, concluded in July 2024, assessed existing certificates and examined an onboarding process for scheme members. Figure 15 depicts both key topics and specific certification aspects addressed by the workstream.

³² The full [mandate for workstream B1](#) is available on the ECB's website.

Figure 15

Overview of the B1 workstream focusing on specific certification aspects



Future work will focus on translating the outcomes of the first sprint into specific rules and on drafting initial roles and responsibilities for certification and testing.

4.1.5 Workstream D1: Risk management

Workstream D1 focuses on risk management requirements in the “end user to PSP to DESP” space.³³ In the second quarter of 2024, this workstream concluded its first sprint on the scope of risk management, including a detailed risk taxonomy. Additionally, the workstream identified relevant existing EU regulations which will require a provision-by-provision evaluation of their interplay with digital euro scheme rulebook requirements. Future work in this workstream will focus, for instance, on setting out risk management requirements based on the risk taxonomy as depicted in Figure 16.

Figure 16

Initial risk taxonomy

Level 1 risk	Level 2 risk category	Level 1 risk	Level 2 risk category
Settlement risks		Compliance and legal risks	Compliance risks
Fraud risks	Unauthorised fraud		Legal risks
	Authorised fraud	Cybersecurity risks	Data breaches
Financial crime risks	AML and KYC compliance		Malware and ransomware
	Sanctions		Phishing attacks
	Financing of terrorism		Technology and security risks
Bribery and corruption			
Operational risks	Transaction processing failures		
	Infrastructure risks		
Reputational risks	Communication / customer service risks		
	Accessibility and inclusion risk		

Each type of risk needs to be mitigated by scheme members, through requirements either defined by existing regulations and/or specific rulebook requirements.

³³ The full [mandate for workstream D1](#) is available on the ECB’s website.

4.1.6 Workstreams G1, G2, G3 and G4: Implementation specifications

Four workstreams have been established to support the development of implementation specifications for a digital euro rulebook. Building on the outcome of the C1 workstream, which provided a full overview of technical scheme requirements, each of the four G workstream addresses a specific front-end or back-end area as defined by the high-level functional architecture depicted in Figure 17:

- G1 is responsible for implementation specifications for interactions between end users;³⁴
- G2 focuses on implementation specifications for interactions between the end user and the payer's PSP;³⁵
- G3 focuses on implementation specifications for interactions between the digital euro user and the payee's PSP³⁶; and
- G4 focuses on implementation specifications for interactions between the DESP and PSPs.³⁷

Figure 17 below summarises the scope of each of these workstreams. G1 started its first sprint in the second quarter of 2024, and workstream G4 was launched in July 2024. Workstreams G2 and G3 will start later in 2024. All of the workstreams will be aimed at drawing on and referring to a number of standards for the writing of digital euro implementation specifications.³⁸ The outcomes of the G workstreams will be translated into rulebook implementation specification annexes, including annexes setting out detailed functional, technical, security and non-functional requirements.

³⁴ The full [mandate for workstream G1](#) is available on the ECB's website.

³⁵ The full [mandate for workstream G2](#) is available on the ECB's website.

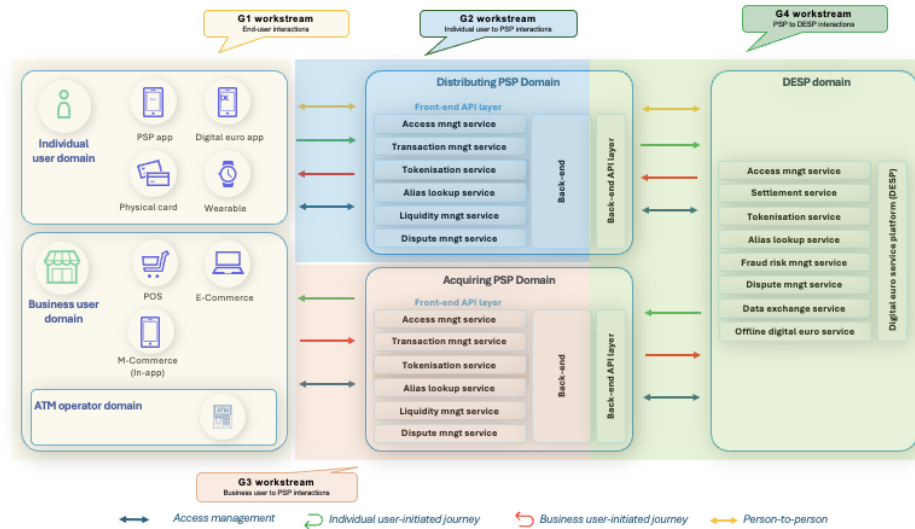
³⁶ The full [mandate for workstream G3](#) is available on the ECB's website.

³⁷ The full [mandate for workstream G4](#) is available on the ECB's website.

³⁸ Please refer to the most recent [update on the work of the digital euro scheme's Rulebook Development Group](#) (pages 25 to 27) for a list of standards currently being explored in the context of the digital euro project.

Figure 17

Overview of the scope of G workstreams mapped onto the high-level architecture of a digital euro



Workstream G1 on implementation specifications for interactions between end users has concluded its first sprint and provided an initial draft setting out the scope of high-level implementation specifications for digital euro users' devices and acceptance devices. The current draft will be further enhanced with additional details such as data elements and specific requirements. Subsequent sprints will focus on incorporating these additional elements.

4.2 RDG input on further subject matters of relevance for the rulebook

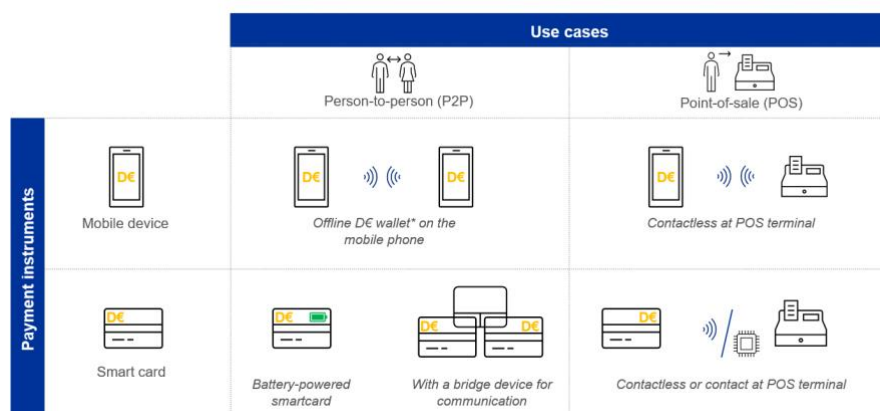
4.2.1 Offline digital euro

In 2024 the RDG provided its feedback on the user experience aspects of an offline digital euro. A digital euro would allow end users to make offline transactions for person-to-person payments as well as payments in physical shops (POS payments). The offline functionality would enable payments to be made without an internet connection. It would thus be available in locations with limited network coverage or in the event of a disruption to online communication (e.g. a power outage or network glitch). Offline digital euro payments would provide a high level of privacy to end users, as the payment would be validated directly by two offline devices (e.g. a mobile phone and a payment card). In addition, transaction data would not be sent through a network but would remain on the devices used for the transaction.

The ECB investigated the deployment of offline functionality for a digital euro in end users' devices in accordance with the requirements set out in the draft legislative proposal, and the RDG was invited to comment on the related user

experiences and end-to-end flows. With regard to form factors³⁹ for an offline digital euro, the ECB investigated alternatives such as battery-powered smart cards or non-powered smart cards that use a bridge device⁴⁰ to connect (see Figure 18). The feedback from the RDG included further reflections on the form factors and the related user experiences and end-to-end flows. This will be taken into account in the ECB's further work on the offline functionality of a digital euro.⁴¹

Figure 18
Use cases and payment instruments for offline digital euro payments



4.2.2 Multiple accounts

In 2024 the RDG members provided feedback on the technical analysis conducted by the ECB on multiple digital euro accounts. The ECB conducted an in-depth technical analysis of the feasibility and implications of allowing multiple digital euro accounts per user while ensuring a holding limit per user, as requested by the [draft legislation on the establishment of the digital euro](#).⁴² The RDG generally acknowledged the findings of the ECB's analysis, which showed that it is technically feasible to provide users with multiple accounts in conjunction with an individual holding limit. The analysis also indicates that trade-offs would be necessary, mainly in terms of user experience and regarding the technical and operational implementation for PSPs. Against this background, the analysis highlighted the value

³⁹ A form factor is a combination of a device from an individual digital euro user (e.g. mobile device, physical card), a digital euro user interface (e.g. a payment application) and a communication technology (e.g. quick response (QR) code-based payment or near-field communication (NFC)-based payment), together supporting the exchange of payment information between payer and payee for payment initiation and authentication.

⁴⁰ A bridge device is a simple, pocket-sized, battery-powered device for establishing a connection channel between two non-powered smart cards, enabling transactions between them. This device should have at least (i) a user interface (e.g. screen and keypad), (ii) communication capabilities, (iii) card reader and near-field communication capabilities, and (iv) a small battery.

⁴¹ See also Chapter 3 of the progress report on the preparation phase of a digital euro.

⁴² See [Technical note on the provision of multiple digital euro accounts to individual end users](#).

of the digital euro's unique "switch-and-port" functionality⁴³, which could bring some of the same benefits as allowing users to hold multiple accounts.

5 Next steps

As outlined in this report, the work of the RDG will feed into a new draft of the rulebook. This new draft will reflect the comments received from the RDG on the first intermediate draft. It will also be supplemented with the additional chapters and further development of existing chapters that the RDG is working on. The new draft version will be finalised in the course of the digital euro preparation phase. In the first quarter of 2025 a new progress report on the work of the RDG will be shared.

The draft rulebook will be sufficiently flexible to accommodate any future adjustments deriving from the digital euro legislative process. The ECB's Governing Council will only decide whether to issue a digital euro once the relevant legislative act has been adopted.

⁴³ This functionality would allow users to easily change PSP, while maintaining their digital euro account number (which is not possible with the IBAN4), including transaction history and information on recurring payments. It would also facilitate switching of digital euro accounts in exceptional circumstances.