# Digital euro development update

## IIF Staff Note

January 30, 2024

On January 3, 2024, the European Central Bank (**ECB**) published an important update on the work of the digital euro scheme's Rulebook Development Group (**Update Report**). The update is a report from the ECB's Rulebook Development Group (**RDG**) on progress towards developing a digital euro payment scheme.[1] This briefing note summarizes the document, identifies some areas of potential concern to financial institutions and identifies some areas where the Update Report may be commended.

We also briefly discuss a recent study that tries to quantify the financial stability and consumer welfare impacts of a digital euro. The study contains some potentially concerning conclusions.

## 1 Background

The digital euro project moved from the investigation phase into the preparation phase following a decision of the European Central Bank (**ECB**) Governing Council in October 2023.

The preparation phase will last for two years and will involve finalizing the digital euro rulebook, selecting providers that could develop a digital euro platform and infrastructure, and testing and experimentation to develop a digital euro that meets both the Eurosystem's requirements and user needs, for example in terms of user experience, privacy, financial inclusion, and environmental footprint.

This decision was made against the backdrop of the European Commission's proposed legislative package for the digital euro, released in June 2023. The launch of the preparation phase is not a decision on whether to issue a digital euro. That decision will only be considered by the Governing Council once the European Union's legislative process has been completed. [2]

[1] The RDG is tasked with defining roles and rules for a digital euro ecosystem. The membership of the RDG as at February 2023 is listed in this document: Members of the Rulebook Development Group (europa.eu). The private sector members of the RDG are trade associations with a European focus. Other members represent consumer interests, and National Central Banks. Dedicated workstreams are focusing on specific topics like authentication, technical interfaces, and scheme compatibility with existing standards.

[2] See Eurosystem proceeds to next phase of digital euro project (europa.eu).

## 2 Key points in rulebook update report

The RDG has drafted initial chapters of a digital euro rulebook covering the functional/operational model, technical scheme requirements, and adherence model. The draft rulebook has not been published, but the draft version as it currently stands has been shared with RDG members for an interim review in the first quarter of 2024.

This first draft of the rulebook covers:

- the functional and operational model, which include the end-to-end flows describing the functioning of all use cases and services in scope of a digital euro;

- the technical scheme requirements, which depict the high-level architecture of a digital euro and some initial and proposed current market standards to be potentially also used for a digital euro; and

- the adherence model of the digital euro scheme, which sets out the rights and obligations of scheme members in accordance with the legislative proposal.

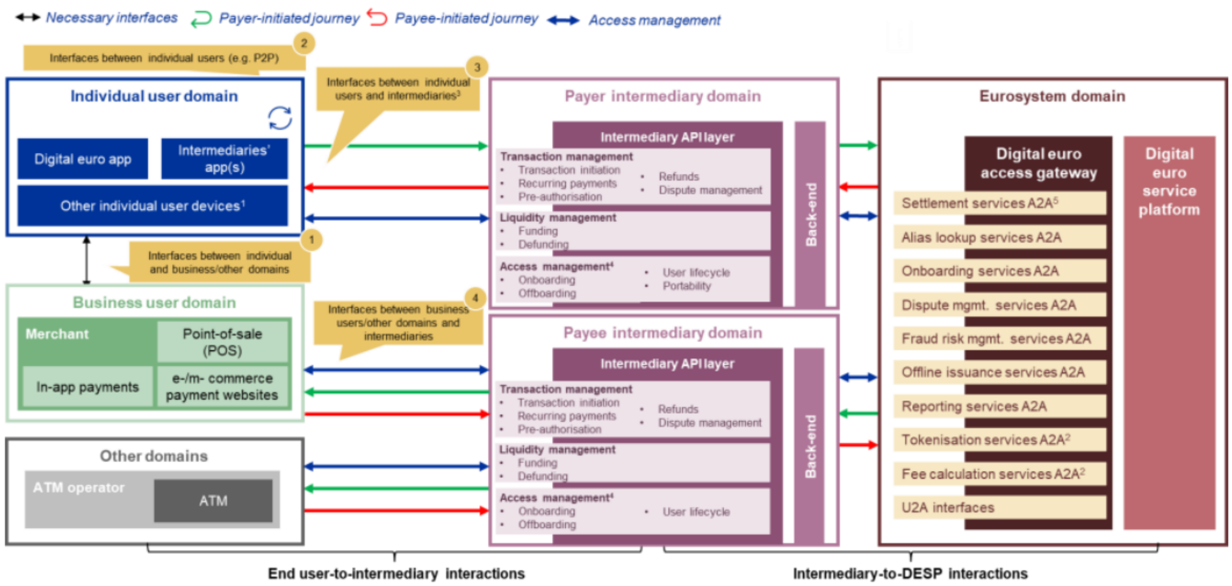
Key actors defined include end users (payers, payees), intermediaries (the scheme participants that receive the digital euro transfer instructions or notifications from the end users), and the Eurosystem comprising the ECB and the national central banks (**NCBs**), providing the digital euro service platform or **DESP**, as well as the digital euro access gateway. Intermediaries can have various roles and may be credit institutions or other payment service providers (e.g. payment institutions or e-money institutions).

Core services covered relate to access management (onboarding/offboarding users), liquidity management (funding/defunding digital euro accounts), and transaction management (initiating/receiving payments).[3] Detailed workflows have been published for multiple transaction types across these core services.

Relationships and minimum data flows between the various actors are outlined in the high-level architecture diagram, reproduced below.

[3] There is no attempt made in the Update Report to map “core” services to “basic” services which are to be provided for free under the proposed digital euro Regulation.

*High-level architecture diagram*




*Source: Update Report, p. 20*

Existing standards will be leveraged where possible. The Update Report mentions a large number of applicable standards in the payments space, including various industry and ISO standards, but states that as a next step, discussions between the relevant standardization bodies and the Eurosystem would need to take place "to further assess the implications of reusing any existing standards for the digital euro."

Next steps are to conduct an interim review of the current rulebook draft, and complete additional sections on areas to include user experience, testing procedures, etc. The draft rulebook will be completed with additional chapters and finalized over the course of the digital euro preparation phase.[4]

## 3 Points of clarification and open issues

There are several statements in the Update Report that clarify the RDG's (and presumably the convening ECB's) current thinking on important technical aspects of the digital euro scheme.

For example, the report says that when requesting a digital euro account number (**DEAN**) from the DESP, intermediaries should have to provide a unique pseudonymized digital euro end user identifier that mirrors the attributes of personal identification data (PID) under the proposed

[4] The preparation phase started on 1 November 2023 and will initially last two years: see [Eurosystem proceeds to next phase of digital euro project (europa.eu)](europa.eu).

eIDAS2 Regulation.[5] It is stated that "this approach, using a hashing technique, would prevent the Eurosystem from accessing data that could directly identify an end user."

DEANs would follow the format to be issued by the Eurosystem, which might look like this: EU + 2 check sum digits + 12 randomized digits (e.g. "EU 12 345678901234"). Although digital euro wallets can be opened without opening a separate European identity wallet, the two systems are intended to be compatible.

While the holding limit to be adopted by the ECB under article 16 of the proposed [Regulation](#) is yet to be defined, there is also reference in the Update Report to differential limits for individuals and businesses. The paper says,

> *Holding limits could also be differentiated by type of user to accommodate the payment needs of citizens (typically on the payer side) and businesses (mainly on the payee side).*

There are also references to a "zero holding limit," for example in this passage:

> *While the reverse waterfall for the private individuals would be an option to activate, the activation of the reverse waterfall mechanism is mandatory for businesses to ensure compliance with zero holding limits when making digital euro payments (e.g. refunds).*

While the reference to a zero holding limit is not further explained, it could be contemplated that for businesses, at least for particular types of accounts or transactions, the holding limit could be set to zero, with all funding and defunding to be done automatically in real time from and to linked bank accounts.

There is also mention of aliases, which are already used in some jurisdictions (including Australia) as a bank account equivalent for payment instruction purposes. The mentions of aliases in the document suggest that they are an integral part of the digital euro's transaction management system, offering a method for users to conduct transactions and manage their accounts within the digital euro ecosystem. The exact mechanics of how aliases will function or be managed are not detailed in the Update Report, but there is mention of the alias lookup service forming part of the digital euro access gateway in the high-level architecture diagram above.

There are interesting details given in the Update Report concerning the various legal acts contemplated. Besides the rulebook, which will be adopted by the ECB Governing Council, there is mention of a "final digital euro legal act, comprising the guiding principles for participation in the digital euro scheme, which will be ultimately aligned with the final digital euro legislation." Importantly, it is stated that contracts between intermediaries and end users must conform to these guiding principles, making all intermediaries and end users stakeholders in the finalization of this legal act, given its impact on freedom of contract. There is separately reference to "the relevant ECB legal act(s) (still to be defined)," implying the possibility of a multiplicity of ECB legal acts. This is, of course, besides the legal acts delegated to the European Commission under articles 11, 33, 34 and 35 of the Regulation.

Lastly, it is also stated that contractual arrangements between the intermediaries and the Eurosystem will cover intermediaries' access to and use of the back-end services of the

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[5] Section 9.1 on page 23. See Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 910/2014 as regards establishing a framework for a European Digital Identity, COM(2021) 281 final.

Eurosystem's DESP. It can be expected that the details of these contractual arrangements will also be keenly watched by potential intermediaries in the digital euro scheme.

There are also important technical details that are left open, pending further discussion within the ECB or among the RDG, and/or further progress in the legislative process. For example, while there is mention of automatic and manual funding and defunding from linked bank accounts (so-called **waterfall/reverse waterfall**), provided by the same or a different intermediary, there is no explanation as to how the holding limit will be enforced for those who choose not to link their digital euro wallet to a bank account for these purposes, and who receive a payment to their wallet that would take them over the holding limit. Presumably, payments in such cases will be blocked, in whole or in part.

The role and definition of the DESP are left somewhat open. It is stated that the DESP will be owned by the Eurosystem (i.e. the ECB and the NCBs), but the governance and operating entit(ies) is not made explicit. The precise boundaries between the DESP and other information systems mentioned including the "digital euro access gateway" are also not precisely demarcated.

# 4 Points of potential concern

Financial institutions, and others including consumers, might be concerned about the transparency of the rulebook development process, as well as by proposals around privacy and the role of NCBs.

**Transparency:** As mentioned, the draft rulebook has not been made public, but is undergoing review by the RDG members in the first quarter of 2024, and the rulebook will be amplified and completed during the digital euro preparation phase.

That the rulebook drafting is taking place amongst a limited set of institutions rather than through a transparent process causes some questions of concern; although several European-focused trade associations and consumer groups are members of the RDG, as well as some financial institutions, it is difficult to assess how effective indirect access granted many financial institutions is in properly informing and helping to steward the process.

Ahead of any adoption of final rulebook and other legal texts, it would normally be expected that public consultation would take place in accordance with the usual processes applicable to delegated European legislation, also informed by the details of the digital euro Regulation when it is finalized. The IIF would suggest that early public consultation may be preferable, well ahead of any formal consultation, to produce the most informed text. Given that non-European trade associations are not members of the RDG, it may be helpful if the ECB were to publish successive drafts of the rulebook and other proposed legal instruments as they are developed to ensure the widest involvement of and inputs from the private sector prior to completion. This would allow all stakeholders, including those based outside the EU but with interests in the digital euro scheme, access to inform the drafting process and aid the ECB in arriving at the best outcome.

**Role of NCBs:** NCBs are given a role as an information conduit between intermediaries in some important transaction types (see figures 8, 9 and 10 in the Update Report). This interposition between the intermediaries, who are capable of directly communicating with each other per other workflows, appears to be unnecessary, and potentially undesirable. It could lead to cybersecurity issues and a gap around liability, particularly if the NCB is shielded by national or EU law from liability for mistakes made in this function.

**Fragmentation risk:** For citizens without a European digital ID, a national-level unique identifier would be required to be presented (in hashed form) at the point when a DEAN is requested by the intermediary from the DESP. It is stated that in such cases "it is up to each Member State to identify the relevant unique and persistent identifier in conformity with Union law." This opens up the possibility both of technical fragmentation of the digital euro scheme across different Member States, but also of a loss of uniqueness if citizens are dual residents or able to establish national ID in different member states.

**Privacy/cybersecurity:** It is stated that "hashing" identifiers passed to the DESP would prevent the Eurosystem from accessing data that could directly identify an end user. This may understate the ability of bad actors or the DESP itself to de-anonymize or reverse-engineer data, particularly concerning large payments, in an environment where the Eurosystem must be able to match hashed identifiers of unique individuals or businesses to monitor conformity to the holding limits to be imposed. Further attention may be required to address the robustness of this process, including the ease with which such data may be deanonymized or re-identified.[6]

# 5 Positive Points

Generally speaking, the further clarity provided in the Update Report is welcome, notwithstanding that there are many open issues and the draft rulebook itself has not been published.

The expressed desire to **leverage existing standards** and solutions for defining digital euro interfaces is a particular positive, in part as it is expected to accelerate market implementation and enhance interoperability. The Update Report states,

> *In defining the digital euro interfaces the aim is to use existing standards and solutions to the degree possible to smoothen the implementation of a digital euro to the market and facilitate potential interoperability with other payment solutions and other central bank digital currencies.*

Efforts to ensure that the digital euro scheme aligns with current functional standards and specifications are acknowledged and supported. However, further detailed work will be important in clarifying the various ISO and other standards that would be applied within the digital euro scheme.

It is also intended to specify a **minimum set of data elements** to be exchanged by the various actors when performing the functions laid out in the rulebook. The expressed intention to detail the data elements to be exchanged by actors within the digital euro system is an important step in establishing robust standards.

[6] See, for example, the methods discussed in Acar, G. (2018), "Four cents to deanonymize: Companies reverse hashed email addresses," blog post.

# 6 Copenhagen Economics paper on impacts of the digital euro

A Copenhagen Economics paper published in December 2023 attempts to quantify the impact of a digital euro on financial stability, on innovation and competition, and on consumer protection. The paper examines various scenarios for holding limits and other dimensions.

The key finding of potential concern to **financial stability** is that:

> *With the holding limit at 3,000 [euro], we find that the digital euro can realistically lead to an outflow of up to 739 billion euro of bank deposits in the euro area. This corresponds to a loss of 10% of the total household deposit base and 3% of the total bank liabilities.*

The authors also conclude that for highly impacted banks, these figures could rise to 20% of the deposit base or 9% of total bank liabilities. Their overall evaluation is that the effect of the digital euro on financial stability should be measured against periods of stress in the financial system. Here, they find that the digital euro could exacerbate depositor runs, if depositors perceive it to be safer than the deposit guarantee schemes in place. For some banks, according to this study, the magnitude of additional funding can indeed be so large that they will most likely be unable to replenish their liquidity.

On impacts on **innovation and competition**, the paper finds that the case for claimed positive effects of a digital euro on consumer welfare is weak for several reasons, including that almost all use cases currently prioritized for the digital euro are covered by existing solutions. Further,

> *[I]mposing arbitrary (low) fees for the use of the digital euro does not necessarily improve consumer welfare. If the fee is below overall costs to banks and other PSPs, it will crowd out existing payment means, hinder private innovation and ultimately, the consumers will bear the burden for lack of cost recovery.*

Lastly, on **consumer welfare**, the paper concludes that the digital euro will create a set of additional launch and recurring costs for commercial banks, other PSPs, and merchants in general – costs that "will at least partly be passed on to consumers in the form of higher prices of goods and services". It estimates that as a result of having to seek more expensive wholesale funding to replace deposits, additional costs imposed on commercial banks can directly reduce access to credit with a negative impact on economic activity. Furthermore, the increase in the cost of borrowing could have a lasting impact on investment decisions and economic activity, and lead to a permanent reduction in GDP on some scenarios of 0.12-0.34%.

# 7 Conclusion

While the Update Report contains a useful update on the digital euro rulebook drafting process, including clarifying some important technical points, it leaves other important points open and may lack the transparency and direct involvement of a greater range of stakeholders that could help to best inform the process. Points of concern include the non-public nature of the drafting process, potential cybersecurity and liability issues around the role of NCBs, and the potential for deanonymization of end-user data by the Eurosystem. Still, there is much to commend, including the additional clarity this Update does provide, and the expressed intention to leverage existing standards. We trust that points of concern will be addressed by the RDG and/or the ECB during the remainder of the preparation phase.

The IIF previously addressed the digital euro project in its September 18, 2023 IIF staff assessment of the digital euro proposal, in which IIF staff concluded that the legislative package for the digital euro as released by the European Commission only partly addressed concerns the IIF had previously identified, and did not address concerns around governance and conflicts of interest. As delineated in that assessment, among other issues, there is no independent oversight envisioned of the ECB's adherence to any operational resilience and availability standards it chooses to adopt. We trust that these issues will be further addressed through the legislative process.

The assessment also judged the European Commission's cost-benefit analysis presented in the legislative packages as "somewhat basic and high-level," and mainly relying on previous studies. While it is helpful to see the recent Copenhagen Economics paper (summarized above) partly fill this gap, we would also urge the ECB and other official sector actors to redouble efforts to meaningfully grapple with plausible impact scenarios around the digital euro in a rigorously quantitative way.