



EUROPEAN CENTRAL BANK

EUROSYSTEM

# A stocktake on the digital euro

Summary report on the investigation phase and  
outlook on the next phase

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# Executive summary

## Scope of the investigation phase

As digital payments are becoming increasingly popular in a digitalised society, the European Central Bank (ECB), like other major central banks around the world, is investigating the feasibility of complementing cash with a central bank digital currency. This report presents the findings of the work the Eurosystem<sup>1</sup> has carried out during the digital euro investigation phase over the past two years.

The Eurosystem has developed a high-level product design and the related functional and non-functional user requirements. This work was supported by prototyping activities to validate the proposed design from a technical perspective and focus group research to gain input on end-user preferences and expectations. Close and transparent engagement with market participants, other EU institutions and policymakers ensured that all stakeholders could provide their feedback on design and distribution options. Market research showed that there is a sufficiently large pool of European providers able to develop digital euro solutions and that a variety of architectural and technological design options are available.

## Why a digital euro

As Europe enters the digital era, a digital euro would be the next step in the evolution of our currency. It would not have the form of a physical coin or banknote, but it would benefit from the most important characteristics of cash as a public good when paying digitally:

- widely accepted and easy to use;
- free for basic use;
- usable for any digital payment in the euro area;
- not requiring an online connection (it could also be used offline);
- offering the highest possible protection of privacy;
- inclusive, leaving no one behind;
- settling payments instantly;
- secure;
- risk-free (as money issued by the central bank);

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<sup>1</sup> The Eurosystem is the central banking system of the euro area. It comprises the ECB and the national central banks of those EU Member States whose currency is the euro.

- usable for payments at the point of sale and person-to-person.

No other digital means of payment offers all these characteristics at once. The digital euro would fill this gap.

A digital euro would exist alongside euro cash and other electronic means of payment, offering additional freedom of choice to end users.

It is the very nature of a central bank to provide its people with free access to safe money. The ability to exchange money issued by banks (or other private money issuers) any time into a form of money that is issued by the central bank (and thus backed by the sovereign) and is legal tender provides reassurance and an anchor of stability for the payments system as a whole. Currently, cash is doing this job alone. In the future a digital euro would ensure public money continues to perform this role even as consumers increasingly prefer to pay digitally.

With a digital euro, people would have more choice in how to pay and a secure solution that fully respects their privacy. The central bank has no interest in monitoring peoples' payment patterns and no commercial aspirations. It would not have access to or store any personal data that would directly identify end users. The digital euro is also intended to achieve a cash-like level of privacy for offline payments, as it would require no third-party validation and would rely simply on the direct transfer from the payer to the payee.

Moreover, a digital euro would be easy to use, so those who have more difficulties with digital devices would not be left behind. A basic service would be available so those who cannot afford a payment card or who do not have a bank account are not excluded. A basic offer should continue to be provided for everyone when it comes to paying, whether it's in-store, online, between individuals or government transfers.

The growing trend towards digital payments has also entailed increased European dependency on foreign service providers. A digital euro would also address risks stemming from geopolitical tensions. The fragility of global supply chains exposed by the coronavirus (COVID-19) pandemic and Russia's war of aggression in Ukraine has painfully demonstrated the risks of relying exclusively on external suppliers for basic needs. A digital euro can strengthen Europe's resilience in at least three ways. First, it would ensure that, in addition to European private payment solutions (which so far have remained national), there would be a payment solution for the euro area under European governance. This would support the strategic autonomy of Europe's entire payment ecosystem. Second, a digital euro would be able to rely on its own underlying infrastructure. This would enhance the overall resilience of Europe's electronic payment system in the event of cyberattacks and technical disruptions. Third, a digital euro would also provide a pan-European platform on which European PSPs could build services with pan-European reach for their customers. This would boost the efficiency of the payments system, driving down costs and fostering innovation.

Of course, alongside the digital euro, euro cash would continue to be available. According to the findings of the latest study on the payment attitudes of consumers

in the euro area (SPACE)<sup>2</sup>, 60% of Europeans like having the option of paying with cash. Whether in digital or physical form, the Eurosystem is committed to providing reliable money.

## Next steps

A digital euro would have a dedicated legislative framework. It will be for European co-legislators to ensure that it replicates key characteristics of cash in the digital sphere. A possible decision by the Governing Council of the ECB to issue a digital euro would be taken only after this legislation has been adopted. And the ECB will consider any changes to the design of a digital euro that may result from the legislative deliberations.

The European Commission initiated the legislative process for a digital euro with the publication of a legislative proposal in June 2023 for adoption by the European Parliament and the Council. The ECB stands ready to provide any technical input needed to support the work of the co-legislators. The draft legislation is consistent with the rationale for a digital euro, and the Eurosystem looks forward to continuing working together with other EU institutions towards introducing a digital euro to ensure our currency is fit for the digital age. The Eurogroup<sup>3</sup> and the European Parliament have regularly discussed the digital euro and have welcomed the Eurosystem's work.

The digital euro investigation phase has shown that the motivations for the issuance of a digital euro are still as relevant as ever, from making key benefits of cash available for digital payments to supporting competition, digitalisation and innovation, strengthening European strategic autonomy and enhancing the resilience of our payments system to ensuring that euro area citizens have a public payment option in an increasingly digitalised world. The digital euro investigation phase has also demonstrated from a product design and distribution perspective that it would be possible to develop a digital euro that meets users' needs and the Eurosystem's requirements. The Governing Council of the ECB has therefore decided to continue the Eurosystem's work on a digital euro by moving to the preparation phase of the project without yet taking a decision on its actual issuance.

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2 See [Study on the payment attitudes of consumers in the euro area \(SPACE\) – 2022](#), ECB, December 2022.

3 The Eurogroup is an informal gathering of the ministers of economics and finance of the euro area member countries, at which they discuss issues connected with their shared responsibilities in respect of the single currency. The European Commission and the ECB are invited to take part in the meetings.

# Introduction

This document summarises the main findings of the digital euro investigation phase and presents the arguments for moving to the next phase of the digital euro project.

Section 1 sets out the main reasons why a digital euro is needed and the value it could bring to each stakeholder group, e.g. individuals, merchants, payment service providers (PSPs) and public authorities. A digital euro would be universally accepted, inclusive and easy to use. It would provide a greater choice of means of payment while offering a very high level of privacy. A digital euro would safeguard the strategic autonomy of the European payments system and increase its resilience while supporting competition and innovation to the benefit of consumers and merchants alike. It would offer a payment solution under European governance. It would also provide a pan-European platform on which European PSPs could create new services for their customers. This would boost the efficiency of the payments system, drive down costs and foster innovation.

Section 2 describes what a digital euro would look like from an end-user perspective. This includes who would be entitled to use a digital euro in the first place, where and when the digital euro could be used and on which devices, using the two complementary online and offline solutions that are meant to cater for different users' preferences and needs. It also explains how a user would be able to get on board with digital euro and possibly switch to a different PSP at a later point in time.

Section 3 sheds light on the roles of PSPs and the Eurosystem in delivering a digital euro, detailing their different tasks and the services they are expected to provide. It also explains how a compensation model should ensure that a digital euro is free for basic use for individuals and that there are incentives for PSPs to distribute and adequate safeguards against excessive service charges for merchants. A strong public-private collaboration is envisaged to ultimately provide end users with the best experience when onboarding, managing a digital euro account and its liquidity and making payments for any purpose they might wish. PSPs would manage the relationships with end users. This would start with the onboarding of end users and continue with the provision of digital euro services and the execution of end users' transactions and liquidity management operations. In the performance of these tasks, PSPs would also be responsible for conducting all necessary anti-money laundering and combating the financing of terrorism (AML/CFT) checks, which are something in which the Eurosystem would not be involved. The Eurosystem would provide PSPs with the necessary support services, particularly in relation to the back-end infrastructure. Moreover, the Eurosystem would make available a digital euro app which would act as a uniform point of entry with a homogeneous look and feel for any end user to access digital euro services. PSPs would be able to choose either to integrate the app within their solutions or to develop their own interface. The Eurosystem would be in charge of making available the offline solution, which would also be distributed by PSPs. Finally, the Eurosystem would draw up a digital euro scheme rulebook in collaboration with market stakeholders to ensure a pan-euro

area reach and harmonised user experience, leveraging as much as possible on existing standards and solutions.

Section 4 explains the reasons for limiting the use of a digital euro as a means of investment.

Section 5 focuses on how a digital euro could be designed and distributed to also meet the needs of vulnerable groups who might face challenges with the digitalisation of financial services and thus their usability. This can be achieved by including accessibility in the design of the digital euro app, by offering a physical payment card as an additional form factor<sup>4</sup> and by establishing a dedicated distribution and support channel. The Eurosystem advocated a harmonised public approach, and this has also been included in the legislative proposal. Each Member State would have to designate a dedicated entity to provide access to digital euro services for those vulnerable to digital financial exclusion, with dedicated assistance for onboarding and continuous support for using digital euro services, at no cost for eligible individuals.

Section 6 reflects on privacy and data protection, describing how the privacy models for a digital euro could shape and be balanced with other public policy objectives. Privacy is a fundamental right and of crucial importance to the public, and the design of a digital euro provides for very high privacy in compliance with legislation. As an underlying principle, the digital euro solution would be designed to minimise the Eurosystem's involvement in user data processing, limiting it to what is necessary to perform its tasks or required by regulation. The Eurosystem, as operator of the settlement component, would not be able to identify any individuals making or receiving digital euro payments.

Section 7 outlines the extensive stakeholder engagement that has characterised the investigation phase, making it possible to exchange views with market participants, civil society, and other EU institutions and policymakers. This helped show that it would be possible, from a product design and distribution perspective, to develop a digital euro that meets the needs of users and the requirements of the Eurosystem.

Section 8 concludes with a brief look at the way forward.

*This report uses terminology that may not always be fully aligned with the terminology used in the legislative proposal. In the next phase of the project, the ECB will implement any adjustments to the digital euro development that may result from the legislative deliberations, including terminological adjustments, to ensure that a digital euro will comply with the legal framework in force when and if it is issued.*

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<sup>4</sup> A form factor is a combination of an end-user device, an end-user interface and communication technology supporting the exchange of payment information between payer and payee for payment initiation and authentication.



# 1 Digital euro – an evolution of our money

The European economy is becoming increasingly digital, and payments are no exception. With the use of cash declining and the shift towards online shopping and digital payments accelerating, it is important to ensure that European money and payments remain secure, safe and future-proof. In this context, a digital euro would have an essential role to play as a public good made available by the central bank to people and merchants. A digital euro would bring tangible benefits for end users, which is reflected in the support for the project from European consumer and merchant associations. A digital euro would ensure that people always have the option to pay with a public means of payment. Like euro cash, a digital euro would be issued by the ECB and have legal tender status. It would make the key benefits of cash available for digital payments while supporting competition, digitalisation and innovation.

As signalled by focus groups, the ability of a digital euro to “simplify life” is what could make it attractive in the eyes of people. The key to this is universality, as the value of a digital euro for many people could lie in it being a payment instrument that “ticks all the boxes”. The digital euro would achieve this in two ways. First, its use cases span across all retail payment situations. Second, it would be available and usable throughout the euro area. No other retail payment instrument can offer the same degree of universality.

A digital euro would bring the key features of cash into the digital era. Like euro cash, a digital euro would offer privacy and be widely accepted across the euro area. It would provide an additional payment option to complement cash and current private digital payment solutions (rather than replace them), tackling payment market fragmentation through a pan-euro area digital means of payment.

A digital euro would be designed to have the highest possible level of privacy in line with the provisions to be decided by legislators. The central bank has no interest in people’s payment patterns or in commercialising any of their information. It would not have access to or store any personal data that would directly identify end users.

A digital euro would be a user-friendly and inclusive financial instrument, ensuring that everyone can have access to digital payments, even without an internet connection, bank account or payment card. It could be used by anyone, including people with limited financial or digital skills and other vulnerable groups. It would be designed for use in physical and online payments, as well as for person-to-person (P2P) transactions.

Euro banknotes and coins are a key symbol of European integration and our monetary union. People understand that a euro held in, for example, a German bank is the same as a euro held in, for example, a Spanish bank, because both can be converted into the same euro banknotes and coins issued by the Eurosystem. However, the use of cash is declining and some Europeans seldom use cash, while those who like to use cash cannot use it in e-commerce. If people see that they can

hold a digital form of cash which they can use to pay each other irrespective of the country they bank in, the sense of sharing the same currency, and thus the strength of that currency, would be better protected.

A digital euro would be universally accepted, inclusive and easy to use. For merchants, it could streamline payment processes by making transactions instant and more efficient. This could translate into lower costs and broader customer reach. It could also offer higher conversion rates at shopping cart checkouts, particularly in online shopping, as customers are less likely to reject a purchase if they are familiar with the payment instrument and can use it everywhere. It would also put merchants in a stronger position to negotiate more favourable conditions with private payment service providers (PSPs), as transaction costs for merchants would probably be lower with digital euro than with other private payment solutions. It would also enable instant payments, giving merchants instant access to their funds – just like cash.

PSPs would play a vital role in the distribution and management of digital euro accounts and providing digital euro-related services in all euro area countries. PSPs would thus maintain customer relationships, generating revenue through associated services. In order to prevent an excessive outflow of bank deposits, the amount of digital euro end users could hold would be limited. However, they would still be able to make purchases beyond that amount, as their digital euro wallet could be linked to their commercial bank account.

A digital euro would be a standardised means of payment, covering all retail payment needs across all euro area countries and providing a pan-European platform for innovative payment services, thereby marking a further advance in European integration. PSPs would have the opportunity to leverage the digital euro infrastructure to develop innovative financial products and services with pan-European reach for their customers, expanding their market offerings and remaining competitive in the evolving digital landscape.

Non-bank PSPs, such as financial technology companies (fintechs) and payment processors, could offer seamless integration of digital euro payments into their platforms and services, attracting a larger euro area-wide user base and benefiting from economies of scale. Moreover, the interoperability of the digital euro system could potentially foster collaboration between banks and non-bank PSPs, creating new business partnerships and driving innovation in the payment industry. This would boost the efficiency of the payments system, drive down costs and foster innovation.

From the policymakers' perspective, a digital euro would also strengthen Europe's strategic autonomy and resilience, minimising its dependence on private external providers, particularly in the context of a potential crisis or geopolitical tensions. It would be a pan-European public means of payment under European governance in line with European regulations and standards. This would help reduce the dominance of private non-European corporations within the European market and make the payments sector more competitive.

A digital euro would provide, for the first time in history, direct access for people to digital central bank money issued and backed by the ECB. It would respect people's privacy, without infringing on public policy objectives such as combatting money laundering.

The introduction of a digital euro would be a logical next step in the natural evolution of our currency. It would ensure the same levels of trust and stability that our money and payments enjoy today, while also adding a new, digital option that addresses the limitations of cash inherent in its physical nature. A digital euro would make the euro future-proof.

## 2 How a digital euro would work from the perspective of end users

The digital euro should meet the needs of end users, both individuals and merchants. The input received from consumers and merchants<sup>5</sup> serves as the foundation of its design.

### 2.1 Who would be able to use a digital euro?

It is up to the legislators to define who can use a digital euro. So far, the proposed provisions<sup>6</sup> coincide with the findings of the investigation phase.

Residents of the euro area would be able to hold and make payments in digital euro.<sup>7</sup> They would be free to choose their digital euro services provider, which could be a PSP with which they already have a commercial bank account.

Extending access to digital euro to persons residing in non-euro area countries, or any wider availability, may be considered as a next step after the launch of a digital euro.<sup>8</sup> Availability of digital euro in a country outside the euro area would always be subject to agreement with the authorities of that country.

Businesses established in the euro area would be able to accept payments in digital euro. The category of business users is broad and includes groups that may overlap, such as professionals, merchants, small and medium-sized enterprises and the self-employed. It is envisaged that those who accept digital payments would also have to accept digital euro.<sup>9</sup>

Other businesses in the European Economic Area (EEA)<sup>10</sup>, or in third countries<sup>11</sup>, providing services to euro area residents in euro would be able to accept digital euro payments through an acquiring provider within the euro area.

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<sup>5</sup> As part of the [public consultation on a digital euro](#), focus groups' "[Study on New Digital Payment Methods](#)", Kantar Public, March 2022; and "[Study on digital wallet features](#)", Kantar Public, March 2023, and the [Study on the payment attitudes of consumers in the euro area \(SPACE\) – 2022](#), ECB, December 2022.

<sup>6</sup> See Article 13 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>7</sup> Citizens of euro area countries who are not resident in the euro area may also have access to digital euro, provided they have the right to open a payment account in a euro area country without being a resident at that point of time.

<sup>8</sup> Tourists visiting the euro area may also be offered limited access to digital euro services at a later stage.

<sup>9</sup> See Chapter III of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>10</sup> The EEA consists of Iceland, Liechtenstein, Norway and the 27 Member States of the EU.

<sup>11</sup> In this context, "third countries" refers to countries outside the euro area and the EEA which do not have an agreement to use the euro.

The public sector in the euro area would also be able to make and receive digital euro payments. This refers to government or public authorities, who similarly to merchants can transact in digital euro via multiple contractual arrangements.

In most cases, the payee would be a business user, but being a business user would not be a general requirement to be able to accept payments. An individual user would be able to be a payee in P2P transactions or when receiving payments (e.g. a refund) from a business user.

## 2.2 How would end users be onboarded to a digital euro?

It would be the responsibility of PSPs to put in place appropriate contractual relationships with their customers, whether individuals or businesses.<sup>12</sup> Onboarding should be structured to be as easy and convenient as possible.

- Where there is an existing business relationship, the PSP should use already available data and should not request the same data again.
- Where there is not an existing business relationship, end users would first have to be onboarded by the PSP they have chosen to provide them with digital euro services. The PSP would carry out the onboarding process and perform know-your-customer (KYC) checks. The KYC process would be governed by existing laws and regulations.
- Under the draft legislation, digital euro users should not be required to have or open non-digital euro payment accounts with, or accept other non-digital euro products from, their provider of digital euro payment services.
- Onboarding should be made possible for the digitally financially excluded (see Section 5).

## 2.3 Would digital euro holdings be limited?

A digital euro would be designed to have no material impact on financial stability or the transmission of monetary policy. This is why tools to control the amount of digital euro in circulation were investigated. Holding limits were identified as an effective tool and would therefore be included in the design of a digital euro.

Holdings of individuals would be subject to a limit to prevent excessive outflows from commercial bank deposits into digital euro. This limit would be set closer to the possible launch date to reflect the economic conditions prevailing at that time.

Business users would have a zero holding limit, meaning they would not be able to accumulate holdings of digital euro, but they would be able to make specific types of payment. Initially this would refer to the processing of payments and refunds.

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<sup>12</sup> See Section 3.1.1.1 for more on the role of PSPs in the onboarding of end users.

Like merchants, government or public authorities would be able to transact in digital euro with a holding limit of zero.

Thus, both business users and public authorities would have any payments received transferred immediately to their commercial bank account, so that their liquidity management would be unaffected and any impact on the financial system would be further mitigated. Any payments they make would be funded instantly from their commercial bank account.

## 2.4 How would you be able to pay with a digital euro? Online and offline digital euro use

A digital euro would be usable online and offline:

- an “online” mode enabling the use of central bank money (i) to ensure coverage of all use cases in most payment situations, (ii) for payments made remotely, which are growing with the digitalisation of the economy, and (iii) so people would not have to rely only on a bearer instrument (which may be lost or stolen) to be able to hold central bank money; and
- an “offline” mode designed to maximise certain cash-like characteristics (i.e. a bearer payment instrument that is not dependent on an online connection, but is limited to proximity payments and would need to be prefunded) and which is intended, subject to legislation, to offer a cash-like level of privacy for offline payments.

People would be able to use both online and offline features of the digital euro to accomplish different goals.

When online, users could pay remotely, e.g. for online purchases, or they could use budgeting applications to analyse their spending. Validation by a PSP as a third party would be required to complete online transactions and comply with payment regulations.

The offline solution would follow a peer-to-peer validation model, where people would be able to make and receive payments in physical proximity without the need to involve a PSP in the transaction. The payment would be settled locally (between the two devices) with no connection to any third party for validation or recording. The monetary value relating to the payment would be exchanged between the secure elements<sup>13</sup> of the two users’ devices in accordance with the rules laid down in the legislative framework and the technical implementation by the Eurosystem. Any offline payment would require the secure storage of a certain amount of digital euro

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<sup>13</sup> A tamper-proof chip with pre-installed software that can store confidential and cryptographic data and run secure applications.

on the secure element. Offline holdings would be subject to a holding limit<sup>14</sup>, which would be a subset of the total individual holding limit and applied per device.

The offline functionality would require prefunding, for which an online connection would be required. Thus, provided users have prefunded their offline wallet beforehand, the offline digital euro could offer a fallback option when no internet connection is available. However, the device used for offline digital euro transactions would still need to go online for verification of security features at regular intervals.

Offline digital euro payments would provide cash-like levels of privacy, but, just like cash in a lost or stolen wallet, any digital euro stored locally on a lost or stolen device would not be recoverable either from the Eurosystem or from the PSP.

## 2.5 How can you fund your digital euro holdings?

Funding modalities<sup>15</sup> are key to a seamless payment experience, particularly in view of holding limits. The usability of the digital euro to send and receive payments should not be impaired by the existence of such holding limits.

Funding sources could be either a commercial bank account or cash<sup>16</sup>. While neither a commercial bank account nor a link between such an account and digital euro holdings would be a prerequisite for individuals to have access to digital euro services, the expectation is that many people would find it convenient to “link” their digital euro account to a designated commercial bank account for funding purposes. This would maximise payment convenience in the following ways.

- It would always be possible to receive a payment, even if the amount to be received raises the digital euro balance above the holding limit. The excess amount would be transferred automatically to the linked commercial bank account (waterfall functionality). Users would also be able to set a threshold for this automatic transfer that is lower than the holding limit.
- Users would not need to prefund a digital euro account before making payments. If there are insufficient funds in the digital euro account, the shortfall could be transferred immediately from the linked commercial bank account (reverse waterfall functionality).

An individual would be able to choose whether to benefit from the waterfall or reverse waterfall functions or both. Waterfalls combine funding/defunding and payment processing in a single operation, with no or very limited impact on the processing time for the user. If there is no linked commercial bank account or waterfalls are not enabled, the user would be responsible for keeping the digital euro

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<sup>14</sup> See Article 16 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>15</sup> “Funding modalities” is used as an umbrella term to cover both the funding and defunding of digital euro holdings.

<sup>16</sup> As an additional funding source, merchants may decide whether to offer a cash-in-shop service, i.e. the exchange of digital euro against cash. If so, such an exchange would be dependent on the merchant’s ability to provide cash.

account balance within the holding limit, increasing the need to manually fund and defund the account and the possibility of transaction failure.

A user with multiple commercial bank accounts would be able to use any of them to fund the digital euro account. However, only one commercial bank account could be designated for the waterfall and reverse waterfall functions. The PSP managing the digital euro account does not need to be the same one managing the linked commercial bank account, and digital holdings may be funded manually or in an automated way.

Offline holdings would only be able to be funded and defunded manually and when the device has an online connection, either directly or via a banking terminal. Offline payments would not be able to exceed the prefunded amount (i.e. waterfalls and reverse waterfalls would not be possible).

A range of funding modalities would be available to suite different user preferences. The modalities are illustrated here together with practical examples which have been tested with focus groups.

- Using digital euro as budget management tool: a person might want to focus on keeping control of their spending with a monthly budget. For example, every month they could automatically top up their digital euro account to the desired amount (automated funding).
- Case-by-case funding: another person might want to fund their digital euro account only when needed, without a specified frequency (manual funding).
- No prefunding for payments: another person might wish to pay in digital euro without having to prefund their digital euro account, drawing the liquidity from their commercial bank account as required (continuous reverse waterfall).<sup>17</sup>

End users would be able to fund and/or defund their digital euro holdings on a 24/7/365 basis. Funding/defunding via digital payment means would be possible anytime. Funding/defunding via cash would be possible at least at times when a PSP is already providing cash services.<sup>18</sup>

## 2.6 Where could you pay with a digital euro?

The digital euro could be used to make any digital payment throughout the euro area, instantly and at any time. Legal tender status and clarity about its implications are key to ensuring that a digital euro would meet such expectations. As a complement to cash in the digital age, a digital euro would be a public good for people to use in all their everyday digital payments.

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<sup>17</sup> If a PSP has a policy which limits how many funds may be withdrawn from its deposit account without pre-notice, this will automatically constrain the extent to which their clients can draw on these funds to make digital euro payments.

<sup>18</sup> See [Annex II](#) of the legislative proposal.



## 2.6.1 Person-to-person (P2P) payments

People would expect to be able to use digital euro to make payments to each other, just like cash. At the moment cash is still the dominant P2P means of payment, although national digital P2P solutions have become popular in several countries. Focus groups valued highly the possibility of making P2P payments digitally and instantly throughout the euro area. With a digital euro it would be possible to make P2P payments both online and offline as soon as it is launched.<sup>19</sup> For P2P payments, near field communication (NFC) and quick response (QR) code technology are being considered along with the digital euro account number (DEAN) or alias (e.g. a mobile phone number) and pay-by-link.

## Point-of-sale (POS) payments

The most common type of retail payment is payments made for goods or services at a physical location. People are increasingly shifting to digital payment options for in-store payments,<sup>20</sup> but in 2022 cash was still the most frequently used payment method at the point of sale in the euro area and was used in 59% of transactions (down from 72% in 2019). If a digital euro is issued it would have to be among the payment options for POS transactions.

POS payments with a digital euro could be either online or offline transactions<sup>21</sup>, depending on whether the POS terminal is equipped with offline settlement capabilities (i.e. a secure element).

In line with market practices, three common POS payment options are being considered for digital euro: NFC-based payments via a mobile or wearable device or card; chip-based payments via a card; QR-code-based payment via a mobile or wearable device.

## 2.6.2 E-commerce payments

E-commerce is a growing market segment in which it is not possible to pay with cash and should be catered for by a digital euro. At the merchant's check-out page, three possibilities are being considered for using digital euro:

- being presented with a QR-code to scan;
- being presented with a link to pay;

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<sup>19</sup> See Article 23 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>20</sup> See [Study on the payment attitudes of consumers in the euro area \(SPACE\) – 2022](#), ECB, December 2022.

<sup>21</sup> See Article 8 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

- being requested to provide a digital euro account number (DEAN) or an alias (e.g. a mobile phone number).

Depending on the interaction, the digital euro mobile app could be used, inviting the user to confirm, authenticate and pay.

In line with current practice, multi-channel payment experiences may also be offered where consumers shop in-store but can still make a “remote” payment (e.g. click-and-collect).

### 2.6.3 Payments to and from government (G2X, X2G)

As a digital euro would be a public good, it would be natural for public authorities to use it to make and receive payments. The technical implementation is very similar to other use cases described above, with G2X being similar to the P2P use case and X2G similar to the POS/e-commerce use cases.

## 2.7 How can you switch PSP?

To avoid lock-in with one PSP, it is of utmost importance that portability<sup>22</sup> from one PSP to another is quick and seamless.<sup>23</sup> This would foster trust and resilience as well as freedom of choice. This could be facilitated by a unique account identifier, which would stay the same even if the account is moved to a new PSP.

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<sup>22</sup> This includes both voluntary portability requested by the end user and emergency portability in the event that a PSP is unable to service the account held at its institution.

<sup>23</sup> The end user would only need to request the new PSP to transfer the account. The new PSP would be able to obtain the data directly from the previous PSP. As with the normal onboarding procedure, additional KYC information would only be needed if the end user has no existing business relationship with the new PSP.

### 3 Making digital euro available: distribution via PSPs

Making digital euro available would require collaboration between the public and private sectors in order to maximise their respective advantages. People would open and manage digital euro accounts with PSPs (like for other digital payments or for accounts from which cash can be withdrawn), but the digital euro they hold would be a liability of the central bank (like cash).

PSPs would distribute digital euro and be responsible for relationships with end users.<sup>24</sup> PSPs would be the entry point to access digital euro services and would perform the initiation and validation of payments. In the performance of these tasks, PSPs would therefore be responsible also for conducting the necessary AML/CFT checks (in which the Eurosystem would not be involved). The Eurosystem would provide PSPs with the necessary support services, as part of the back-end infrastructure. The figure below shows how activities would be split.

Figure 1: Overview of the allocation of activities



#### 3.1 Role of individual PSPs

PSPs that meet the requirements established by the Payment Services Directive (PSD2)<sup>25</sup> for the provision of payment account services and that provide retail payment services would be expected to offer digital euro services.<sup>26</sup> These PSPs, and not the Eurosystem directly, would have a contractual account management relationship with the end user.

PSPs would need to provide the following basic digital euro services to end users, as mandated by the legislative proposal and described in the digital euro scheme, on top of which they may also offer optional and value-added services.

<sup>24</sup> See Chapter IV of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>25</sup> [Directive \(EU\) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation \(EU\) No 1093/2010, and repealing Directive 2007/64/EC \(OJ L 337, 23.12.2015, p. 35\)](#).

<sup>26</sup> The payment initiation service provider and the account information service provider would need to access digital euro accounts through the account servicing PSP with the explicit consent of the individual user.

Figure 2: Overview of included basic services

User management	Liquidity management	Transaction management
Onboarding digital euro end users	Funding (manual and automated)	Transaction initiation (one-off transactions)
Offboarding digital euro end users	Reverse waterfall	Authentication
Payment instrument management (both provision and maintenance)	Defunding (manual and automated)	Payment confirmation/rejection notification
Linking digital euro account to commercial bank account	Waterfall	Refunds
User lifecycle management processes (identification, data update, information display on balance and transactions, account recovery, account portability and end user support)		Dispute/exception management
		Recurring payments

The draft legislation does not currently list automated funding, portability and dispute management among the basic services which would be free for basic use. On the other hand, it does include free funding and defunding with cash.

### 3.1.1 User management

User management encompasses onboarding and offboarding, payment instrument management, linking digital euro holdings to a commercial bank account, and lifecycle management processes enabling end users to interact with their digital euro account at a PSP, including the option of digital euro portability. Authentication of end users for all of these processes would be the responsibility of the PSP.

#### 3.1.1.1 Onboarding

Onboarding consists of activities that provide an end user with access to digital euro services and the ability to pay, be paid and access holdings in digital euro.

PSPs would be responsible for the onboarding of end users, either remotely or on the PSPs premises.<sup>27</sup> An end user would be onboarded either as an individual or as a merchant.<sup>28</sup> Individuals would be offered the options of holding digital euro both offline and online during onboarding. The onboarding process and the related due diligence and KYC checks would be the responsibility of the PSP.

During the onboarding process, PSPs would provide individual users with:

<sup>27</sup> Offering onboarding both remotely and on-premises is crucial to promote digital financial inclusion, but it will only be mandatory for PSPs identified in the context of the public approach (see Section 5 on Supporting financial and digital inclusion). Full remote onboarding could strengthen the accessibility of a digital euro for people facing geographical and social barriers, while face-to-face onboarding could benefit people who are less confident with digitalisation, including the elderly.

<sup>28</sup> The same end user may be onboarded by the same PSP both as individual and as merchant, but this would require two separate onboarding procedures and result into two different digital euro users.

- user credentials, including a digital euro account number (DEAN)<sup>29</sup> that they can share with payers to receive payments (in case of emergencies, a PSP identifier<sup>30</sup> and a technical proof of digital euro ownership<sup>31</sup> would also be provided or embedded in the user application);
- a user application to access the digital euro holdings, which could be the digital euro app or a functionality integrated in existing proprietary PSP applications (e.g. a commercial bank app and online interface);
- the possibility to register aliases<sup>32</sup> linked to the DEAN;
- if requested by the user, a physical card.

As an end user should not have more than one digital euro account, the PSP would be required to query an onboarding repository to find out if the end user had been already onboarded by another PSP. If the end user has already been onboarded and still wishes to open an account with the PSP, the end user would need to move their existing holdings through a portability request.

During a change of PSP (portability) both the DEAN and the alias would stay the same. If the new PSP already has a business relationship with the user, no additional KYC checks would be needed. If not, the new PSP would have to run a new onboarding process and perform the related KYC checks. In the standard scenario, the new PSP would cooperate with the old PSP to obtain the necessary information to update the repository and to transfer the holdings. In an emergency scenario, the new PSP would use the user's technical proof of digital euro ownership to complete the process. At the user's discretion, the payment history and recurring payments could also be ported.

Business users would be provided with the acceptance solutions for POS and eCommerce payments. During the onboarding process, business users would receive from their PSP:

- one or multiple DEAN(s), depending on the number of contractual agreements activated;
- an upgrade of their POS/virtual terminal to enable the acceptance of digital euro payments;
- a user application for businesses to access their digital euro holdings, integrated into existing proprietary applications for liquidity and fund management.

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<sup>29</sup> The DEAN would be the identifier of the digital euro account holder, serving a number of purposes.

<sup>30</sup> The PSP identifier would be needed in emergencies to identify the PSP to which a transaction should be sent if the central alias lookup service fails.

<sup>31</sup> The technical proof would be specific to the contractual arrangement that the user has with a PSP for the provision of digital euro services. It would allow an end user to prove ownership of digital euro holdings in the event of extreme (unprecedented) incidents affecting the PSP's IT system.

<sup>32</sup> Aliases would be data identifying an individual, such as a mobile telephone number.

### 3.1.1.2 Offboarding

At any point in time an end user would be able to stop using digital euro and end their contractual relationship for digital euro with their PSP. This is supported by an offboarding process.

The offboarding process would be offered by the PSP, which would have to:

- determine whether the end user has digital euro holdings and defund them before deactivating the user's data and returning the funds associated with a DEAN to a commercial bank account chosen by the end user;
- unlink the digital euro account from the linked commercial bank account (if enabled);
- terminate active recurring payments;
- disable access to form factors, including acceptance solutions and applications, for both online and offline usage where relevant.

In the case of the offboarding of a business user, the account may need to remain open for a certain period of time to support refunds. As per current market practice for other payment methods, an option to delay the offboarding process for a business user is thus envisaged. If a merchant is fully offboarded but is still obliged to accept digital euro in compliance with its legal tender status, the merchant would need to be onboarded again.

### 3.1.1.3 Payment instrument management

PSPs are responsible for distributing the payment instrument to the consumer and for its maintenance. This may be an app on a mobile device or a payment card.

### 3.1.1.4 Linking the digital euro account to commercial bank money

It is possible for an end user to link several commercial bank accounts to a single digital euro account. However, there must be no ambiguity about which commercial bank account should be used for automated funding and defunding or for waterfall and reverse waterfall purposes. Since it would be possible to link accounts provided by two different PSPs, the balance of the linked commercial bank account may not be visible to the PSP distributing the digital euro, while the balance of the digital euro account may not be visible to the PSP providing the linked commercial bank account.

### 3.1.1.5 User lifecycle management processes

PSPs would need to ensure that end users are able to perform the following tasks (this list may be enhanced over time depending on the digital euro use case):

- registering or editing their profile settings, such as aliases;
- enabling/disabling different types of notifications;
- seeing and editing different types of limits and thresholds;
- seeing and adding/removing commercial bank accounts linked for funding purposes;
- checking the digital euro balance and the transaction history;
- blocking and unblocking digital euro payments, payment instruments and certain functionalities (e.g. NFC).

Furthermore, individuals might authorise third-party providers (TPPs) (i.e. account information service providers (AISPs) and payment initiation service providers (PISPs)) to access their digital euro holdings via their PSP to benefit from certain services (e.g. aggregation of account information, payment initiation).

For business users, it is assumed that acquirers would be able to provide digital euro reconciliation reporting, by integrating digital euro payments into existing solutions used for other retail payment schemes.

## 3.1.2 Liquidity management

### 3.1.2.1 Funding and defunding

PSPs would have to enable all end users to manage their digital euro liquidity according to the relevant funding modalities described in Section 2.5.

PSPs would have to make digital funding and defunding functionalities available to end users on a 24/7/365 basis, as well as defunding via cash; while cash funding would have to be possible at least at times when a PSP is already providing cash services. Only manual funding and defunding would be applicable to offline digital euro holdings.

While in the case of defunding via cash it can be assumed that the user would be able to use any ATM in the euro area, for cash funding further analysis will be required. This is driven by the fact that not all ATMs are equipped to handle cash deposits, and in some euro area countries users are only allowed to deposit cash at the ATM of their own bank. If the form factor used at the ATM can support both online and offline digital euro holdings, the ATM would have to allow the user to choose where the funds should be credited/debited.

### 3.1.2.2 Waterfall and reverse waterfall

As described in Section 2.5, funding modalities are key to a seamless payment experience, particularly in view of holding limits.

If the end user has linked a commercial bank account to the digital euro one and subsequently enabled the reverse waterfall, funding from the commercial bank account would happen automatically when digital euro holdings are not sufficient to complete a payment. Such a payment would then be completed in digital euro at its full value. The link would have to be configured and activated in advance by the end user before the transaction can be successfully validated and submitted for settlement. The PSP would instruct a funding request as part of the transaction.

If a PSP has a policy limiting the funds that may be withdrawn from a user's commercial bank account without pre-notice, this restriction may be carried over to the user's digital euro holdings. As a result of the funding process, PSP's central bank money holdings would be converted into digital euro (digital euro issuance) reducing the PSP's central bank money balance, debiting the commercial bank account and crediting the digital euro holdings of the end user.

Similarly, an end user may also allow automatic transfers of funds to a commercial bank account if the digital euro holding limit is reached; this is called the waterfall functionality. Again, the link would have to be configured and activated in advance by the end user. The PSP would instruct a defunding request as part of the transaction.

A special case would be multiple incoming payments arriving in quick succession, each of which is validated without triggering the waterfall because none of them would individually breach the holding limit, but together they do. The waterfall would then be triggered after transaction settlement upon a signal from the PSP service monitoring individual holdings.

Waterfall functionalities could also be used if the end user links a private account with a PSP other than the one managing the end user's digital euro holdings.

Business users would have a zero holding limit. This would be enforced by automatic defunding (a waterfall) whenever a payment is received. For merchants/businesses, defunding from a digital euro account to a commercial bank account would be done on a transactional basis. However, on top of the standard functionality, PSPs could offer business users other digital euro payment schedules (e.g. daily) and make one aggregated digital euro pay-out instead of multiple digital euro pay-outs per transaction. This would require an acquirer to collect and aggregate transactions on behalf of the merchant and make combined payments to a commercial bank account (on a daily or other basis).

While online digital euro holdings for business users would be zero, offline holdings would be an exception. Owing to the inherent design features of the offline digital euro, business users would hold offline digital euro in their acceptance devices until the devices have connectivity to defund them. However, while allowing such holdings by businesses would be necessary to enable an offline digital euro to function, no decision has yet been made on the amount of funds that business users would be



able to hold in their offline devices or number of consecutive offline transactions they could accept. This may be defined closer to the launch date. A limited amount of offline digital euro holdings may even be warranted indefinitely to enable refunds and pay-outs at any point in a business day.

### 3.1.3 Transaction management

Transaction management refers to services offered by PSPs to end users related to the administration and processing of transactions. This is a collection of processes, including payment initiation, user authentication, confirmation or rejection notification, refunds, recurrent payments and dispute management.

#### 3.1.3.1 Payment initiation, authentication and confirmation

Users would instruct the initiation of a payment through their PSP via the digital euro app, a proprietary app or online interface of the PSP, or a payment card. The PSP would request the user to authenticate, perform the necessary checks (perform the associated AML/CFT and fraud risk checks) and route the transaction for settlement after validation.

Authentication refers to a security mechanism for verifying the identity of an individual or other entity (including verification by means of a computer or computer application). The digital euro scheme would not provide authentication methods itself, but would be open to the reuse of existing authentication methods, including the EU Digital Identity Wallet (EUDIW)<sup>33</sup> once available.

A valid payment request would be followed by a settlement instruction submitted to the settlement infrastructure. Depending on the specific use case, this could be by submitted the PSP of either the payer or the payee. This settlement instruction would not contain user-identifiable data.

A digital euro could be used for payments where the amount and time of the payment are not known at the checkout, for example to reserve a holiday apartment or use a car sharing service, requiring the payer to provide certainty that they would be able to fulfil any subsequent payment obligation. The process required would consist of a pre-authorisation<sup>34</sup> of a payment up to a given maximum amount and for a given timeframe<sup>35</sup>, while the actual amount would be set at a later date. The final confirmation and settlement would happen as for any other transaction, requiring additional authorisation if the final amount exceeds the maximum.

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<sup>33</sup> For more on the European Digital Identity initiative, see the [European Commission's website](#).

<sup>34</sup> A payment "pre-authorisation" in the front-end solution is equivalent to a "reservation" of holdings in the back-end infrastructure.

<sup>35</sup> The scheme rulebook will define a maximum timeframe for pre-authorisations, although the payer and payee could agree on a different, shorter timeframe. Changes to the agreed timeframe would require the authorisation of the payer. The maximum timeframe may differ per use case.

### 3.1.3.2 Recurring payments

Recurring payments could be scheduled for both P2P and e-commerce payments.

Individuals would be able to set up recurring P2P payments through their PSP by defining payment parameters (e.g. amount and frequency). Once set up, individuals would be able to access active recurring payments to either amend their parameters or terminate them before expiration. The payer's PSP would notify the payee's PSP of such actions, and the payee's PSP would in turn notify the payee. An authentication step may be required, depending on the settings chosen by the user.

Recurring e-commerce payments would be able to be set up either online or via a mobile app. At the request of an individual, a merchant would set up a recurring e-commerce payment in digital euro for a known or unknown amount. This service could then be used to instruct periodic payments and would not require digital euro holdings to be reserved. Instead the individual would consent to periodic payments being made to the merchant. Where the amount is not known in advance, a maximum amount per transaction would also be agreed when the recurring payment is set up, above which the payer's authentication would be required or the payment request would be rejected. Once the recurring payment order has been set up and the consent of the payer has been obtained, no regular action would be required on the part of the payee, as payments would be triggered automatically.

Like the initial setup, the amendment or termination of a recurring payment could require the individual to make a request to the merchant. The user would receive a confirmation from their PSP that the merchant has performed the requested modification. Alternatively, a person could request the termination of a recurring payment through their PSP, of which the merchant would be notified. If a recurring payment order has been set up with a PSP specifying a particular duration or a certain number of payments, the order would be cancelled automatically by the PSP once the condition is fulfilled. If a person is offboarded from digital euro, all recurring payments would be cancelled.

### 3.1.3.3 Refunds

Refunds from merchants would be possible for all digital euro transactions, regardless of the size or category of the merchant. A digital euro payment could only be refunded via digital euro, in line with market practice, to prevent, for example, money laundering. Refunds could be initiated for several reasons and not necessarily following a complaint, such as the return of the goods by the payer or issues affecting the merchant. A refund in digital euro would also be independent of the user device/interface and payment initiation technology used.

Refunds should take place within a reasonable timeline and in line with other digital payment methods accepted by the merchant. The scheme rulebook will further clarify refund rules and timelines.

On the user's side, refunds could be received without the need for a linked commercial bank account, unless holding limits would be breached, in which case a waterfall would be needed. If the waterfall functionality is not activated and there is not enough room within the holding limit to receive the incoming refund, this refund process would fail and an alternative payment instrument would need to be used for the refund. On the merchant's side, a reverse waterfall would be needed to provide sufficient digital euro, as business users will not be allowed to hold digital euros.

### 3.1.3.4 Dispute management

Dispute management solutions are part of most retail payment schemes. There are various reasons why a payment might be disputed by the payer after a successfully completed financial transaction, like lost, stolen or damaged goods, questionable merchant activity, disputed transaction amount, lack of payer consent, fraud, etc.

Apart from legal requirements<sup>36</sup>, the main reasons to introduce specific dispute management rules and procedures for a digital euro would be to protect consumers and foster trust in the payment scheme.

An end user would be able to dispute a successful or unsuccessful payment. Three phases of dispute resolution are distinguished.

1. Pre-dispute: payer and payee try to clarify the underlying case between themselves directly through their PSPs.
  2. Dispute resolution: after an unsuccessful pre-dispute phase, a dispute resolution phase is initiated, the difference being that the PSPs become actively involved during this phase to resolve the dispute.
  3. Arbitration: the final and exceptional phase of the dispute management process is the arbitration process. In the event that the PSPs were not able to resolve the dispute, a third party other than the Eurosystem<sup>37</sup> should be referred to as arbiter. That party may be, among others, an ombudsman, a court of arbitration or a respected industry body with experience in the arbitration space.
- Dispute management rules for the digital euro would cover pre-dispute and dispute resolution and would be detailed in the scheme rulebook, taking into consideration the principles set out below. The baseline for dispute resolution rules, particularly their scope, is the PSD2.
  - Technical disputes (meaning disputes which occur due to technical errors, causing for instance the transaction amount to differ, duplication of transactions, or improper authorisation/pre-validation).

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<sup>36</sup> See Article 101 of PSD2.

<sup>37</sup> In order to ensure user privacy vis-a-vis the Eurosystem and respecting the competencies of the Eurosystem.

Fraud disputes (meaning disputes based on potential fraud cases, such as identity theft, merchant identity fraud, interception of payment information, counterfeit goods, questionable merchant activity).

The Eurosystem shall not take on liabilities of other stakeholders. Hence, either the PSP, the merchant or, in some cases, the consumer would be liable. The Eurosystem shall not be part of commercial disputes. However, there is room for the market to innovate, for example by providing commercial dispute resolution services.

## 3.2 Supporting services provided by the Eurosystem

The Eurosystem would strive to ensure that PSPs can offer a harmonised and secure service throughout the euro area, available to hundreds of millions of end users. The Eurosystem would support this by making several services available to PSPs. The technical architecture of these services would be designed according to sound architecture principles, while service level, IT security and cyber security requirements would be key to ensuring confidentiality, integrity and availability.

The basic service provided by the Eurosystem would be settlement of online digital euro transactions. Other centrally offered services would have the goal of reducing the complexity of transaction processing for market participants and of simplifying the implementation of the digital euro services they offer to end users.

### 3.2.1 Settlement

Since a digital euro would be issued on the balance sheet of the Eurosystem, any potential inaccuracy in the settlement of digital euro transactions would imply a risk of undue central bank money creation. As the entity liable for the digital euro, the Eurosystem would need to take responsibility for recording digital euro liabilities in its own books. The Eurosystem maintains the ledger which determines the “root of title” of all the money it issues and executes instant settlement of digital euro transactions.

An end user’s digital euro holdings as recorded in the Eurosystem infrastructure cannot be falsified by a PSP and would therefore be accurate at all times. Data available to the Eurosystem would be limited to what is necessary to perform critical digital euro-related tasks within the regulatory framework and would also be pseudonymised.

### 3.2.2 Scheme

A single set of rules, practices and standards would ensure that the digital euro reaches all European residents equally and with equal user experience and perception. This means that euro area residents would be able to pay and be paid in digital euro irrespective of the PSP with which they open their digital euro account or

the countries in which they make payments. These requirements would be ensured by the digital euro scheme.

The Eurosystem has gathered expert stakeholders from all sides of the payment market (consumers, retailers and PSPs) to develop a scheme rulebook for the digital euro with the maximum possible market support. The scope of the scheme would be limited to what is needed to achieve the above objective, while enabling market participants to develop further services and user experiences. The scheme would seek to leverage existing standards and solutions (to the degree possible and subject to regulatory requirements) to minimise the need for additional investments by PSPs.

### 3.2.3 Onboarding checks and portability support

The Eurosystem would be in charge of keeping an onboarding repository that would function as a register of (pseudonymised) information on the opening of digital euro accounts by end users.<sup>38</sup> This would enable end users to switch between PSPs (portability) and could be used to enforce limits on the number of accounts and/or digital euro holdings that an end user can have. The data held by the Eurosystem would be minimal and pseudonymised. The PSP would still be responsible for moving actual end user data to a different PSP when a user requests this, or for communicating the results of limit checks.

### 3.2.4 Alias lookup

The alias lookup component would be responsible for creating new digital euro account numbers (DEANs) and mapping each DEAN to the PSP responsible for servicing the underlying holdings. This would enable PSPs to perform pre-settlement validation of transactions.

Optionally, when end users choose to specify aliases (like a mobile phone), the alias lookup component could be responsible for maintaining and resolving the mapping of an alias to a DEAN (and to the responsible PSP).

### 3.2.5 Dispute management platform

A dispute management service made available to PSPs by the Eurosystem would enable encrypted communication between the PSPs of the payer and the payee for pre-dispute and dispute processes.<sup>39</sup> It would ensure technical format compliance by PSPs, avoiding manual intervention, and would include business logic validation to reduce the number of invalid disputes by PSPs. This service itself would not mediate between the parties but would allow parties to initiate and resolve disputes between

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<sup>38</sup> The Eurosystem would not be able to attribute the information to an identified digital euro user.

<sup>39</sup> For more on the role of PSPs in dispute management, see Section 3.1.3.4.

themselves. A central service would make it easier to cater for all digital euro users in line with European (PSD2) and national law.

### 3.2.6 Fraud and risk management

Fraud detection and prevention is a critical part of user protection in any payment system. For people to adopt and continue to use a payment solution, they need to feel it is safe and secure. Therefore a dedicated digital euro central fraud detection and prevention function should be in place for the launch of the digital euro. A centralised fraud and risk management service would enable a higher level of fraud protection than a single PSP could provide on its own. It would include tools for the secure exchange of information among PSPs, collecting fraud-related statistics, fraud monitoring, and risk scoring for transactions. A high level of fraud protection fosters trust among end users. At the same time, the infrastructure would use pseudonymised data provided by PSPs to protect the privacy of individuals.

### 3.2.7 Digital euro app

The digital euro app would be a mobile application made available by the Eurosystem to users to interact with their PSP via a smartphone, for example to display information or initiate payments. It is a front-end solution for all prioritised use cases of the digital euro. Providing this app would ensure that basic functionalities are available, as identified by consumer's associations and market surveys, as well as features supporting digital inclusion and the needs of people with disabilities and low digital skills. It would also lower barriers to entry for PSPs that do not have the resources to develop their own digital euro app.

The digital euro app would provide a uniform point of entry with a homogeneous look and feel but cannot be used without onboarding with a PSP. PSPs would still be free to develop and work with their own app to interact with end users.

The digital euro app would be kept up to date with the latest versions of mobile operating systems.

### 3.2.8 Funding enabler for credit institutions

This service enables credit institutions to fund end-user accounts from dedicated cash accounts (DCAs). It would further support credit institutions in the management and transfer of liquidity between the digital euro platform and other services in euro and potentially, in a second phase, in other currencies. Credit institutions with a DCA can also act on behalf of PSPs that do not hold their own DCA to fund their users.

### 3.2.9 Offline digital euro provision

The Eurosystem is committed to providing software components for PSPs to be able to distribute offline digital euro, central services to allow the issuance of offline digital euro, and a solution to implement the offline wallet, either in the digital euro app or integrated in PSP apps or as a payment card. Details on the exact components and services will be defined in future stages of the project. Together they aim to ensure that:

- transactions would be settled instantly using secure hardware to prevent hacking and forging;
- payments received would be able to be re-spent offline without the need to go online;
- the Eurosystem would not see users' personal details or their payment patterns.

### 3.2.10 Multi-currency enabling features

Cross-currency payments between the digital euro and other currencies shall be subject to prior agreements between the ECB and the national central banks of the Member States whose currency is not the euro and third countries.<sup>40</sup>

Whereas project resources should focus on timely delivery of the first releases of a digital euro, aiming to meet the needs of the euro area market, multi-currency enabling features will be integrated into the digital euro back-end. This would ease interoperability at a later stage, keeping the door open to a possible single system approach with the onboarding of additional currencies. This would be subject to requirements set by the Eurosystem regarding the design, timing and governance of the infrastructure and would depend on the interest expressed by EU/EEA central banks ready to accept the requirements that the Eurosystem will set on the digital euro back-end.

## 3.3 Digital euro compensation model

As a digital form of cash and a monetary anchor, the digital euro would be a public good and a natural evolution of cash in the digital sphere. The digital euro compensation model seeks a balance between adequate incentives for PSPs to distribute a digital euro and adequate safeguards for end users. This balance can be achieved by enhancing opportunities for PSPs to achieve European scale. Four core principles need to be considered when establishing a digital euro compensation model:

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<sup>40</sup> See Article 21 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

1. **Free basic use by private individuals:** all basic services necessary to enable people to pay and be paid with digital euro in a convenient manner (onboarding, account opening and holding, funding and defunding via electronic means<sup>41</sup> including waterfall/reverse waterfall, provision of a basic payment instrument, and making and receiving payments, including recurring payments) should be free-of-charge.
2. **Network effects generating economic incentives for acquiring PSPs and merchants:** PSPs would be able to charge merchants for their services, in line with cash and other payment methods where merchants also face costs. Co-legislators could decide to implement safeguards to prevent potential abuse and ensure that merchant service charges are reasonable.
3. **Comparable economic incentives for distributing PSPs:** the economic incentives for PSPs to distribute digital euro to private individuals should be similar to those for other electronic payment solutions. In order to achieve this, distributing PSPs should receive compensation from acquiring PSPs in the form of an inter-PSP fee. This should incentivise PSPs to promote optimal usability and end-user experience.
4. **The Eurosystem bears its own costs, as with production and issuance of banknotes:** PSPs would bear their own costs related to the distribution of the digital euro services they provide, but they would not be charged by the Eurosystem for its costs related to scheme management and settlement processing, following a similar logic to euro cash and reflecting the nature of digital euro as a public good. Any potential savings that arise from this should benefit end users by reducing their costs.

The draft digital euro legislation supports these principles by (i) defining the basic services for which PSPs shall not charge fees to natural persons,<sup>42</sup> (ii) establishing legal tender status for digital euro and allowing PSPs to apply merchant service charges that cannot exceed the fees applied for comparable digital means of payment,<sup>43</sup> (iii) establishing capped inter-PSP fees to provide similar distribution incentives as those applicable to comparable digital means of payment,<sup>44</sup> and (iv) highlighting the intention of the Eurosystem to bear its own costs, as it does with the production and issuance of banknotes<sup>45</sup>.

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<sup>41</sup> It is also envisaged that funding and defunding via cash would be free of charge. See [Annex II](#) of the legislative proposal.

<sup>42</sup> See Article 17.1 and [Annex II](#) of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>43</sup> See Chapter III and Article 17.2 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>44</sup> See Article 17.2 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>45</sup> See Recital 41 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).



## 3.4 How a digital euro would fit in the ecosystem

### 3.4.1 A close companion of cash

Digital euro and euro cash would complement each other by serving different needs, with the digital euro bringing some of the most popular features of cash into the digital sphere.

Some of these features are institutional, as both digital euro and euro cash would be legal tender. Under the legislative proposal, digital euro would have similar network effects to cash so it would always be an option for payers.

Cash possesses certain characteristics owing to its nature as a bearer instrument, including (i) the highest level of privacy, since the payment requires no third-party validation and relies simply on the transfer of possession from the payer to the payee; (ii) offline usage in proximity payments; (iii) the risk of losing the value of the money if the bearer instrument is lost or stolen. An offline digital euro would reproduce the same characteristics in a mobile phone or card format.

The features of cash that are most appreciated according to consumer surveys<sup>46</sup> (e.g. privacy, immediate settlement, wide acceptability) would also be available with a digital euro in the digital sphere.<sup>47</sup>

### 3.4.2 Enabling European private payment solutions to build on “digital euro rails”

The legal tender status of a digital euro could serve as an indirect enabler for European private payment solutions to achieve European scale. Solutions built on instant payments could more easily expand their services to the point of interaction. Once a digital euro is established, these solutions could run on “digital euro rails” without having to resort to agreements with non-European companies as is currently the case. End users should always have the freedom to decide how to pay, with digital euro being one of the options made available. And the digital euro option should always be clear to the end user.

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<sup>46</sup> See [Study on the payment attitudes of consumers in the euro area \(SPACE\) – 2022](#), ECB, December 2022.

<sup>47</sup> It should be noted, however, that digital transactions always leave some trace in the devices used, and acceptance may be limited by AML rules and the necessity to hold a device for the acceptance of digital payments.

## 4 Limitations as a means of investment

People have the right to convert their sight deposits into cash at any point of time. However, their appetite to do so is constrained by the fact that holding large amounts of cash bears the risk that it could be lost or stolen. A digital euro would seek to maintain the healthy equilibrium which has existed for decades between bank deposits and central bank money. There would therefore need to be certain limits on the amount of digital euro users can hold (i.e. a holding limit per user).

A digital euro would be designed to have no material impact on financial stability and the transmission of monetary policy. Limiting digital euro holdings mitigates risks that might be triggered by rapid flights from bank deposits into digital euro, including risks related to short-term liquidity and challenges for commercial bank funding and credit intermediation. The level of the individual holding limit would be calibrated closer to the digital euro release date in order to take the most recent economic outlook into account.<sup>48</sup>

Digital euro would not alter the speed at which people may withdraw funds from their account at a PSP. As well as being effectively capped by the digital euro holding limit, withdrawals from commercial bank accounts would also be subject to the conditions each PSP establishes for its own clients concerning the level of funds that can be withdrawn without pre-notice on a daily basis.<sup>49</sup> Any transaction limits applied to digital euro would thus be motivated by fraud management considerations (as is the case for other payments today) and not by financial stability considerations.

Holdings of digital euro would not be remunerated, thereby conveying a strong public signal that it is intended as a complement to cash. At this stage the Eurosystem does not intend to develop any functionality to remunerate digital euro holdings.

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<sup>48</sup> For analysis already conducted on this topic, see “[Central bank digital currency and bank intermediation](#)”, *Occasional Paper Series*, No 293, ECB, May 2022.

<sup>49</sup> Daily limits seem to be common practice, but it could be over any specified period (e.g. weekly).

## 5 Supporting financial and digital inclusion

People living in the euro area today have costless access to a safe and universally accepted means of payment in the form of euro cash, which is important for financial inclusion. This should also be true to the extent possible for digital and online payments. In this context, a digital euro cannot be decoupled from the topic of digital inclusion, which concerns people adversely affected by the digitalisation of financial services and thus their usability.

Promoting digital financial inclusion is a key principle underlying the concept of a digital euro. This is particularly important given the envisaged legal tender status of a digital euro and the associated measures to ensure its accessibility and use.<sup>50</sup>

In broad terms, digital financial inclusion refers to the use of digital financial services to advance financial inclusion, i.e. the deployment of digital means to reach financially excluded and underserved populations with such financial services. In the context of a digital euro, this means making it accessible, easy to use and affordable for end user groups prone to digital financial exclusion in order to meet their digital payment needs.

A digital euro would be designed to be inclusive and accessible for people with low digital and financial skills and resources, as well those with disabilities or functional limitations and the elderly. The Eurosystem would seek to design a digital euro app in a way that is mindful of their needs. It would be translated into all official EU languages and be compliant with the European Accessibility Act<sup>51</sup>. A digital euro payment card would be available for those who are vulnerable to digital financial exclusion and prefer a physical card to an app, while the option of funding and defunding via cash would also allow a simple top-up of a digital euro device without using a smartphone. Moreover, people should be able to get on board with digital euro either remotely or in-person and should be able to switch PSPs easily. An offline functionality would also support digital euro payments in areas with poor network coverage. It is important to note that the groups of people vulnerable to digital financial exclusion are diverse and numerous. And financial inclusion is not only about access to financial services, but also their usability. This extends financial exclusion to people who live in underserved areas in terms of internet connectivity or those with disabilities or who are disadvantaged by their personal background or are less adept at dealing with digital payments, including in view of Europe's ageing populations.

Barriers to digital euro inclusivity are not expected to differ from those observed for other digital payment solutions. Some progress has already been made in this area, but the digital euro should go beyond the social welfare goals of the Payment

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<sup>50</sup> See Articles 14 and 22(1) of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>51</sup> [Directive \(EU\) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services \(OJ L 151, 7.6.2019, p. 70\)](#).

Accounts Directive (PAD)<sup>52</sup>. The digital euro would have the complementary goal of ensuring wide availability of the monetary anchor to all euro area residents.

To foster access to and usability of a digital euro, the Eurosystem plans to:

- design the stand-alone digital euro app to (i) be as user friendly, easy to use and accessible as possible, being mindful of the needs of people with disabilities and low digital or financial skills; (ii) be translated into all official languages of the European Union; (iii) enable the setting of individual parameters;
- ensure full compliance with the European Accessibility Act;
- facilitate a physical payment card as an additional form factor;
- set up targeted educational efforts closer to the launch date.

In addition, the Eurosystem advocated a harmonised, public approach to ensure that end users at risk of exclusion are onboarded and receive continuous support. To this end, Member States shall designate at least one dedicated entity per country (for example the post office, a giro institution or a credit union). This entity would be in charge of providing access to digital euro services and the necessary support, to those vulnerable to digital financial exclusion, including those who do not hold or do not wish to hold a non-digital euro payment account, without any cost to the eligible individuals. Such support shall comprise dedicated assistance for onboarding to a digital euro account and using all basic digital euro services. For instance, dedicated face-to-face interaction could be offered to help and guide users in need of dedicated support through all the steps of the onboarding process; these users could also receive a physical digital euro payment card, coupled with the possibility of funding or defunding their digital euro wallet via cash.<sup>53</sup> The Eurosystem stands ready to provide the necessary technical support and engage with all relevant stakeholders to enable a highly inclusive digital euro.

Furthermore, under the proposed regulation a digital euro account would fall within the scope of the PAD, meaning that mandated access to a payment account with basic features would also apply to access to a digital euro account with basic services. Unbanked people would need to go through the onboarding process either with a PSP distributing the digital euro or with the entity designated for the public approach. Among the responsibilities of the latter would be to onboard those who have been denied onboarding for reasons other than fraud or AML/CFT infringements. Needless to say, promoting inclusion cannot override compliance with AML/CFT requirements, which must always be observed.

Finally, minors (or other people requiring a legal guardian) would onboard and interact with a digital euro in the same way as they would do for any other payment

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<sup>52</sup> [Directive 2014/92/EU of the European Parliament and of the Council of 23 July 2014 on the comparability of fees related to payment accounts, payment account switching and access to payment accounts with basic features \(OJ L 257, 28.8.2014, p. 214\).](#)

<sup>53</sup> See Articles 14 and 22(1) of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro.](#)

instrument. While the Eurosystem supported establishing a harmonised age to open a digital euro account throughout the euro area, it is up to the relevant legislators to eventually define it.

## 6 Privacy and data protection

The right to privacy and personal data protection are fundamental rights of individuals.<sup>54</sup> They are also crucial objectives of a digital euro.<sup>55</sup> The need to protect people's privacy, as well as their need to be in control of their personal data, were key takeaways from ECB interactions with the public on digital euro.<sup>56</sup> Ensuring an appropriate level of privacy and data protection is important to foster public trust in a digital euro, which would underpin its adoption and use. The Eurosystem would not have access to or store any data that could directly identify end users. Rigorous standards of privacy, accountability for the protection of users' data, and transparency on how information would be secured and used are essential for a digital euro to command trust and confidence.<sup>57</sup>

However, privacy and data protection need to be balanced with other public policy objectives,<sup>58</sup> in particular anti-money laundering and combating the financing of terrorism (AML/CFT) and combating tax evasion. In addition, open banking can be facilitated by the sharing of private data. It is up to co-legislators to determine where to establish the appropriate balance amongst these objectives. A digital euro would comply with the legal framework in place at the time of its potential issuance.

### 6.1 Privacy model for a digital euro

**Onboarding:** Users of any digital payment services currently need to identify themselves to their PSP before they can start making use of such services. Under the draft legislation, onboarding to digital euro services would be treated in a similar way to other digital payment services. This would also be a prerequisite to limiting the use of the digital euro as a form of investment – a limitation that is important from a financial stability perspective.

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<sup>54</sup> The right to privacy and personal data protection are enshrined in Articles 7 and 8 of the [Charter of Fundamental Rights of the European Union](#).

<sup>55</sup> The Eurosystem is committed to upholding the highest standards in data protection, complying with the applicable legal framework. The EU has sought to combat the misuse of personal data through the [General Data Protection Regulation \(GDPR\)](#) by introducing more transparency requirements on data controllers and processors, as well as limits on the nature of information gathered and how it is used. This has set a high bar for data protection and put the EU at the forefront in the international comparison. The rigorous standards of the GDPR and the corresponding regulation applicable to Union institutions (the [European Union Data Protection Regulation, EUDPR](#)) would apply to the issuance and use of the digital euro when personal data are processed. Every actor in the digital euro ecosystem would be bound by these rules.

<sup>56</sup> In a public consultation conducted by the ECB in 2020, 43% of respondents ranked privacy as the most important aspect of the digital euro (well ahead of other features) in order to maintain trust in payments in the digital age. See the [Eurosystem report on the public consultation on a digital euro](#) and the accompanying focus group report.

<sup>57</sup> As also outlined in the [G7 Public Policy Principles for Retail Central Bank Digital Currencies](#).

<sup>58</sup> AML/CFT and taxation are already recognised as important public interests in the EU's data protection framework.

**Online and offline digital euro privacy implications:** People would be able to decide whether to use the digital euro online or offline in a given use case, weighing the various advantages and tailoring its use to their specific needs, including privacy.

### 6.1.1 Privacy model for the offline digital euro

An offline digital euro would provide a higher level of privacy for low-value, offline, proximity payments, in line with their lower risk profile. Offline payments do not involve sharing transaction data with PSPs, the Eurosystem or any potential providers of supporting services, except for what may be required to avoid forgery of digital euro. The draft legislation provides for a high level of privacy for low-value offline payments, which are treated as cash-like proximity payments.<sup>59</sup>

Offline digital euro payments would be edging closer to a cash-like experience. A user would load digital euro to their device, similar to getting cash from an ATM. The necessity for physical proximity in offline digital euro payments and limits in terms of offline digital euro holdings and transactions might lower the risk of criminal misuse. The exemption of offline digital euro payments from certain AML/CFT obligations would only be possible if the co-legislators find it consistent with the usual risk-based approach to apply such exemptions.

### 6.1.2 Privacy model for the online digital euro

Under the draft legislation, the treatment of online digital euro payments would be consistent with data protection, privacy and AML/CFT rules as in the case of private digital means of payment and in conformity with other relevant legislation already applicable to electronic payments.<sup>60</sup> The amount of data related to online digital euro payments available to the respective PSPs would be limited to what is necessary to perform basic digital euro services and consistent with what is required by regulation, in compliance with the GDPR. Online payments below a certain threshold might benefit from a higher level of privacy if the co-legislators were to decide to allow this in electronic payments that may take place remotely.<sup>61</sup>

Data available to the Eurosystem would be limited to what is necessary to perform critical digital euro-related tasks within the regulatory framework and would also be pseudonymised.

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<sup>59</sup> PSPs will not be requested to process any data related to such transactions. This will allow users to pay small amounts offline with a higher level of privacy than other electronic payments. See Article 37 of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>60</sup> See Chapter VIII of the [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#).

<sup>61</sup> The [Transfer of Funds Regulation \(TFR\)](#) includes the possibility to reduce the information accompanying low-value transactions. Where applicable, financial intermediaries can also apply simplified due diligence (SDD), both during user onboarding and transaction monitoring. However, SDD is not currently harmonised across the EU and its application differs considerably across obliged entities. The AML package adopted in July 2021 is aimed at harmonising SDD across the EU, which would be of particular relevance for a digital euro as a pan-euro area payment instrument.

## 6.2 Users in control of their personal data

Digital euro users would have full control over how their own personal data are used. This includes an opt-in rather than an opt-out for allowing PSPs to process a user's personal data for commercial purposes or to provide additional services. Without express consent from digital euro users, their personal data cannot be used for any purposes beyond what is legally required for the purposes of onboarding and the processing of digital euro payment transactions.<sup>62</sup> End users who decide not to opt-in to such use of their personal data should not have any limitations put on their access to basic digital euro services. The digital euro scheme will ensure that users will be able to make an informed decision and will not be forced to allow use of their personal data (beyond what is necessary for compliance with legal requirements) in order to make full use of basic digital euro services.

PSPs would be able to see the data shared by their respective end users to the extent necessary to provide basic digital euro services within the regulatory framework. Any user data obtained by PSPs during the onboarding process and in their role as digital euro distributors, initiators of transactions and providers of additional services would remain with the respective PSP unless it is needed to perform digital euro-related tasks within the regulatory framework.

## 6.3 What personal data can the Eurosystem see?

A digital euro solution would be designed to minimise the Eurosystem's involvement in the processing of users' personal data. The Eurosystem as operator of the settlement component would not be able to identify any natural person making or receiving digital euro payments. This can be achieved by pseudonymisation and clear segregation of personal data between the PSPs, any potential providers of supporting services and the Eurosystem, using state-of-the-art privacy-enhancing techniques.<sup>63</sup> Data available to the Eurosystem would be limited to what is necessary to perform its tasks within the regulatory framework and pseudonymised.

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<sup>62</sup> It is common practice for user consent to be obtained via an opt-in. This would not release the distributing PSP from relying on an appropriate legal basis in accordance with Article 6(4) GDPR (and also Article 22 GDPR in case of profiling) and the need to inform and seek consent from the data subject for any further processing for the purpose of offering additional services. PSPs would be controllers of personal data processed by them for such purposes.

<sup>63</sup> For example, the settlement infrastructure would not be able to trace the information to back a specific user thanks to hashing and other cryptographic techniques.



## 7 Collaboration with stakeholders and key inputs received in the project investigation phase

Throughout the whole investigation phase, the Eurosystem has greatly benefitted from an open exchange with all stakeholders.<sup>64</sup> Close and transparent engagements with market participants, civil society, other EU institutions and policymakers ensured that all stakeholders could provide their feedback on design and distribution options.

Collaboration took place on multiple fronts. A Market Advisory Group (MAG)<sup>65</sup> was established to advise the Eurosystem on the design and distribution of a potential digital euro from an industry perspective, and on how a digital euro could add value for all players in the euro area's diverse payments ecosystem.<sup>66</sup> Design and distribution options for a digital euro were also considered in the Eurosystem's established forum for institutional dialogue on retail payments, the Euro Retail Payments Board (ERPB)<sup>67</sup>.

In addition, the ECB invited market participants to take part in market research to get an overview of options for the technical design of possible digital euro components and services.<sup>68</sup> The market research covered 12 different components<sup>69</sup> that may be needed to support a digital euro, addressing ways to deal with their development, maintenance and operation. These components would enable the issuance and redemption of digital euro, the initiation, processing and settlement of transactions, the management and protection of user access and user data, and all necessary interfaces between digital euro components and with digital euro users. At a cross-component level, the results of the market research revealed that most functional and non-functional requirements can be addressed in multiple ways. Requirements related to data privacy, scalability and security were also covered in a comprehensive manner. In particular, a high level of privacy could be met for the purpose of settlement. The research indicated that there is a sufficiently large pool of European providers that are able to develop digital euro solutions. It also suggested that different types of architectural and technological design options are available to build a technical solution for a digital euro.

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<sup>64</sup> For more information on stakeholder engagement, see the [ECB's website](#).

<sup>65</sup> See [ECB announces members of Digital Euro Market Advisory Group](#).

<sup>66</sup> A representative of the European Commission and representatives of euro area national central banks were also invited to participate in the group.

<sup>67</sup> The ERPB consists of high-level representatives of industry associations and represents a wide range of stakeholders. See [ERPB composition](#).

<sup>68</sup> See [Market Research Outcome Report](#).

<sup>69</sup> Components included in the market research: Settlement, Dedicated Cash Account (DCA) Management, Reference Data Management, Data Warehouse, Offline Solution, Access Gateway, Standalone App, Integrated Banking App Software Development Kit (SDK), Proxy Lookup, Onboarding Repository, Dispute Management, and Fraud Detection and Prevention.

The ECB also conducted a prototyping exercise<sup>70</sup> on what paying with a digital euro could look like in different use cases. The exercise included the integration of five user interfaces developed by different selected market participants for each use case and a settlement system developed by the Eurosystem. The scope of the front-end prototypes, developed by providers, included both a wallet service and user-facing apps/devices. The aspects researched for the online back-end prototype included performance, scalability, resilience, security, privacy and feasibility of conditional payments. For the offline prototype they included settlement finality, technical interoperability between different offline solutions and with the online solution, transaction performance and modular design. Finally, for the front-end prototypes they comprised end-to-end integration aspects. Most of the objectives have been achieved and many valuable insights have emerged from the activities. The exercise was also useful to technically test the interface between the front-end and back-end layers, and the results showed a smooth interaction. The prototyping exercise included offline payments. In line with the Eurosystem's objectives, it was possible to deepen the understanding of their technical characteristics. The tests concluded that it is possible to smoothly integrate a digital euro into the existing payment landscape, while still leaving scope for the market to use innovative features and technologies when distributing a digital euro.

Moreover, the Eurosystem engaged with the public and merchants through dedicated surveys, conducting focus group research<sup>71</sup> to gain input on end-user preferences and expectations, and by holding technical workshops with the industry.

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<sup>70</sup> See [“Digital euro – Prototype summary and lessons learned”](#), ECB, 2023.

<sup>71</sup> For the findings of the focus group research, see [“Study on New Digital Payment Methods”](#), Kantar Public, March 2022; and [“Study on digital wallet features”](#), Kantar Public, March 2023.

## 8 Way forward

This report presented the findings of the investigation phase of the digital euro project. This work has proved that it would be possible to develop a digital euro that, from a product design and distribution perspective, meets users' needs and the Eurosystem's requirements.

**The ECB stands ready to provide any technical input needed to support the work of EU co-legislators.** To this end, the ECB has held exchanges with the European Parliament and euro area finance ministers and has closely cooperated with the European Commission to review, at the technical level, a broad range of policy, legal and technical questions emerging from the possible introduction of a digital euro. The Eurogroup and the European Parliament have regularly discussed the digital euro and welcomed the Eurosystem's work.<sup>72</sup> Euro area Heads of State and Government encouraged the taking forward of the exploratory work on the possible introduction of a digital euro.<sup>73</sup>

With respect to the proposed legislation on a digital euro, the European Commission has recommended that the European Parliament and the EU Council consult the ECB on the proposed legislative changes. Following requests for consultation, the ECB would deliver its opinion in due course.

**A possible decision by the Governing Council of the ECB to issue a digital euro would be taken only after the legislative act is adopted.** The ECB will closely follow the legislative debate and implement any appropriate adjustments to the digital euro development that may result from the legislative deliberations, to ensure that the digital euro will comply with the legal framework in force at the time of its possible issuance.

**Meanwhile, based on the findings of the investigation phase, the Governing Council of the ECB has decided to move to the next phase of the digital euro project.** The first stage of the preparation phase, beginning in November 2023, will last for two years, during which the Eurosystem will focus on further testing and experimenting and will continue to consult with all stakeholders, including the public, to ensure a digital euro meets the highest standards of quality, security and usability. Possible subsequent steps would be decided by the Governing Council after two years based on the results of the first stage and developments in the legislative process.

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<sup>72</sup> See, for example, [Eurogroup statement on the digital euro project](#), 16 January 2023; [European Parliament resolution of 16 February 2023 on the European Central Bank – annual report 2022](#).

<sup>73</sup> See [Statement by the Members of the Euro Summit](#), Brussels, 25 March 2021.

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Postal address 60640 Frankfurt am Main, Germany  
Telephone +49 69 1344 0  
Website [www.ecb.europa.eu](http://www.ecb.europa.eu)

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