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WORKING DOCUMENT

From:	EUROPEAN CENTRAL BANK
To:	Working Party on Financial Services and the Banking Union (Digital Euro Package)
	Financial Services Attachés
Subject:	Digital euro - Informal (VTC) WP meeting on 22 March 2024 - ECB presentation on Multiple accounts

EUROPEAN CENTRAL BANK

EUROSYSTEM

Technical considerations on providing multiple digital euro accounts

This presentation has not been adopted or endorsed by the decision-making bodies of the ECB. The information transmitted is intended for the co-legislators and for the purpose of facilitating discussions on the interplay between multiple accounts and the management of an individual holding limit.

22 March 2024

Digital euro team

Context (1/2)

Legislative Proposal

Art 13.7
"*Digital euro users may have one or several digital euro payment accounts with the same or different payment service providers.***"**

Art 16.6
"In case a digital euro user has multiple digital euro payment accounts, the digital euro user shall specify to the payment service providers with which the digital euro payment accounts are held how the individual holding limit is to be allocated between the different digital euro payment accounts."

Context (2/2)

● **ECB legal opinion (31/10)**

§ 9.3 - "The ECB intends to conduct and share with the co-legislators an in-depth technical analysis of the interplay between multiple accounts and the management of an individual holding limit."

Aspects considered in the technical analysis

The **interplay between multiple accounts and the management of the individual holding limit** is assessed from the following perspectives:

1. **Privacy** and data protection

2. **User experience**

3. **Enforcement of holding limits**

4. **Maintaining offline holding limits**

5. Provision of **joint accounts**

6. **Switching vs. opening a new account**

Conclusions

Multiple accounts with an individual holding limit are **technically feasible.**

However, it implies **trade-offs** in terms of:

- **User experience**
- **PSPs** technical and operational **implementation**

Feeding the legislative debate by showing **the value of the digital euro's 'switch & port' functionality, which might address some of the objectives multiple accounts** in terms of preserving competition and freedom of choice.

1

PUBLIC

Privacy

No need for the Eurosystem to process more personal data

- The **Single Access Point (SAP)** is needed <u>irrespective</u> of a single or multiple account approach for the purpose of enabling PSPs to **enforce the holding limits and ensuring (emergency) account switching**

- **Increases necessary data elements** stored in the SAP but <u>holding limits and types are not critical for privacy</u> *(personal data visible to Eurosystem is pseudonymized)* → **Eurosystem could not infer the identity or the holdings of any individual**

Illustration of possible architecture of the SAP: data visible to the Eurosystem

Table 1: Necessary data elements in the single account context			
User identifier	**Hashed technical proof**	**User type**	**PSP identifier**
#rT9jjA2*(Ltd	7a3119bd2e32cc883a	Individual	EU478821

Table 2: Necessary data elements in the multiple account context					
User identifier	**Hashed technical proof**	**User type**	**Holding limit**	**Holdings type**	**PSP identifier**
#rT9jjA2*(Ltd	7a3119bd2e32cc883a	Individual	800	Online	EU4788
#rT9jjA2*(Ltd	38aaa311c294a4313a	Individual	600	Online	EU2457
#rT9jjA2*(Ltd	41a55b3ac19c1d1221	Individual	1300	Online	EU3724
#rT9jjA2*(Ltd	a5sdf11bb03cca781d	Individual	300	Offline	EU3724

Data elements visible to PSPs vs. Eurosystem in the SAP in a multiple account scenario

Table 3: Data elements visible to the PSP "EU3724" in the SAP

User identifier	Hashed technical proof	User type	Holding limit	Holdings type	PSP identifier	Sum of online holding limit allocation	Sum of offline holding limit allocation
			Anonymised				
			Anonymised			2700	300
#rT9jjA2*(Ltd	41a55b3ac19c1d1221	Individual	1300	Online	EU3724		
#rT9jjA2*(Ltd	a5sdf11bb03cca781d	Individual	300	Offline	EU3724		

The SAP provides PSPs with **information on their customers' overall holding limit capacity.**

A PSP cannot see which other PSPs their customer has a digital euro account with.

Table 2: Data elements visible to the Eurosystem in the SAP

User identifier	Hashed technical proof	User type	Holding limit	Holdings type	PSP identifier
#rT9jjA2*(Ltd	7a3119bd2e32cc883a	Individual	800	Online	EU4788
#rT9jjA2*(Ltd	38aaa311c294a4313a	Individual	600	Online	EU2457
#rT9jjA2*(Ltd	41a55b3ac19c1d1221	Individual	1300	Online	EU3724
#rT9jjA2*(Ltd	a5sdf11bb03cca781d	Individual	300	Offline	EU3724

2

User experience

User experience: Opening a new account in a multiple account scenario

- **Opening an additional digital euro account would entail more choices and therefore steps for a user**

- **PSPs would need to dedicate effort in their service desks** to explain these choices

Table 4: Illustration of steps involved in onboarding process in a single and multiple account scenarios

Steps required	Single account	Multiple accounts	
		First account	Further accounts
Collecting KYC information	x	x	x
User assigns holding limit to one / several PSPs			
User splits holding limit between online and offline holdings and, potentially, across offline devices			Reflected in next slide

# Three dimensions users could split the individual holding

The legislative proposal provides users the possibility to **allocate their individual holding limit across three interrelated dimensions**:

1. Between **online and offline holdings**

2. Between **multiple offline devices**, if users opt to have more than one device

3. Between **multiple accounts with different PSPs**, if users would opt to do so
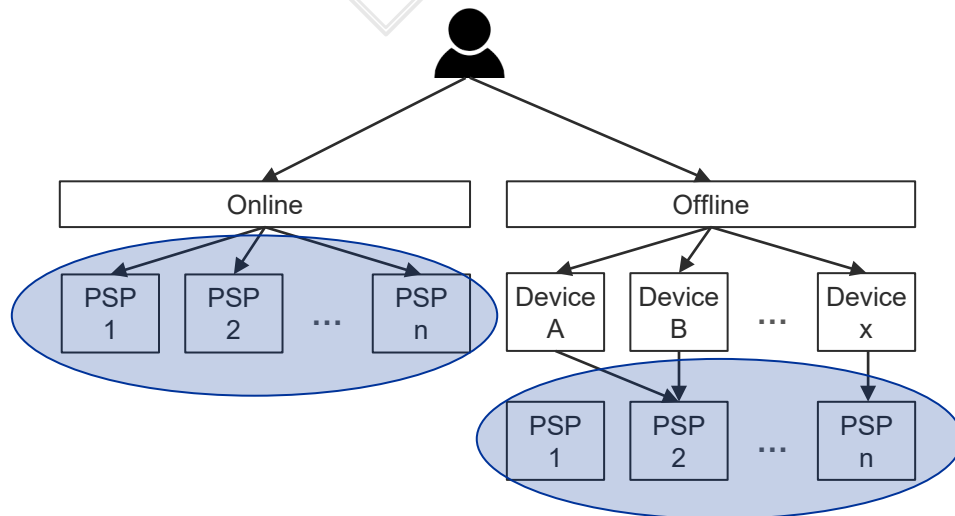
Steps required by a user to customise a holding limit

- Opening an additional digital euro account with a new PSP **requires adjusting holding limit(s) with the previous PSP(s)**

- What if a user has **forgotten** at which PSP they first opened a digital euro account?
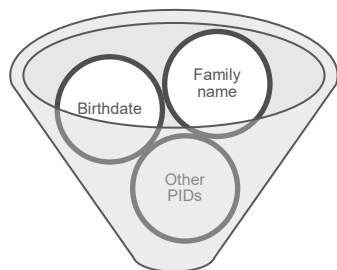
3
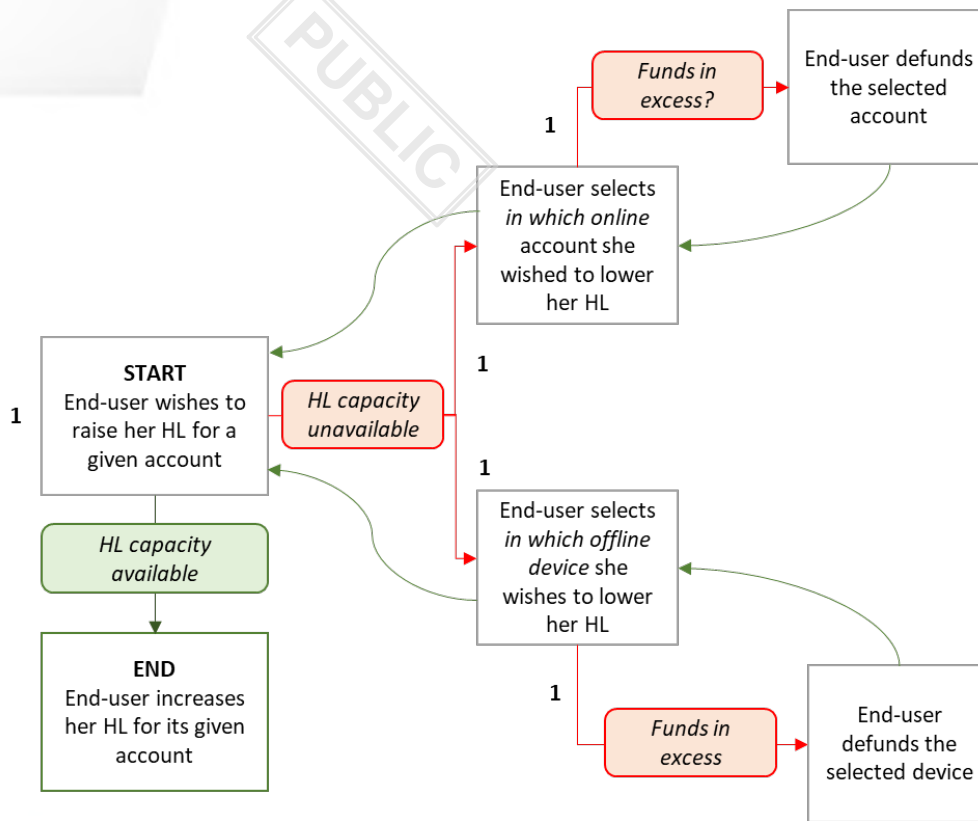
Enforcement of holding limits

Risk of (temporary) duplication of an individual's holding limit if one of the identity attributes, used to determine the hashed user identifier, changes

User identifier generated

Holding limit would be duplicated until <u>all</u> PSPs update the SAP with the new hashed user identifier

One of the multiple PSPs identifies this change in a regular KYC check and updates the SAP

If e.g. family name changes, <u>the user identifier can change</u>

Family name

Birthdate

Other PIDs

What happens in the SAP if one of the PSPs detects that the hashed user identifier needs to be changed?

Day 1

Table 1: Data elements stored in the SAP in the **multiple account** context					
User identifier	Hashed technical proof	User type	Holding limit	Holdings type	PSP identifier
d)%@&b3jz	7a3119bd2e32cc883a	Individual	800	Online	EU4788
#rT9jjA2*(Ltd	38aaa311c294a4313a	Individual	600	Online	EU2457
#rT9jjA2*(Ltd	41a55b3ac19c1d1221	Individual	1300	Online	EU3724
#rT9jjA2*(Ltd	A5sdf11bb03cca781d	Individual	300	Offline	EU3724

?

Time 1 → x: User has a double holding limit capacity

Day "x"

Table 1: Data elements stored in the SAP in the **multiple account** context					
User identifier	Hashed technical proof	User type	Holding limit	Holdings type	PSP identifier
d)%@&b3jz	7a3119bd2e32cc883a	Individual	800	Online	EU4788
d)%@&b3jz	38aaa311c294a4313a	Individual	600	Online	EU2457
d)%@&b3jz	41a55b3ac19c1d1221	Individual	1300	Online	EU3724
d)%@&b3jz	a5sdf11bb03cca781d	Individual	300	Offline	EU3724

Can the user identifier be expected to be stable throughout a person's lifetime?
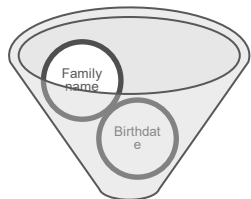
Which personal identifiers to select?

Trade-off: **More** identity attributes used for determining the hashed user identifier implies:

- **Stronger hash**: Ensures identity attributes cannot be retrieved from its hashed user identifier!

- **Higher risk of change** in **any** of the identity attributes, resulting in the capacity for the user to duplicate the holding limit

4

Maintaining offline holding limits

Multiple accounts = PSPs need to update the SAP every time users make changes their offline holding limits
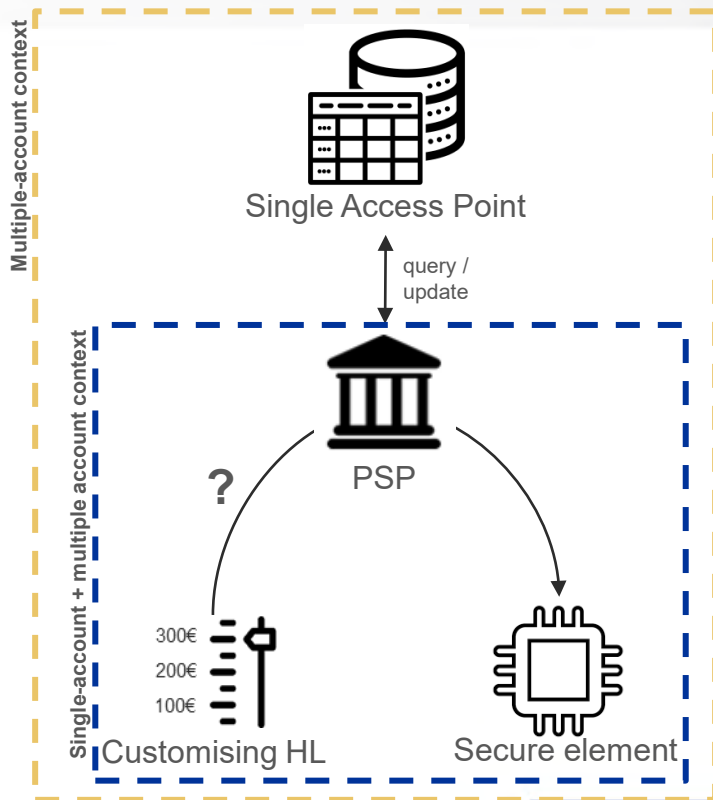
**Needed in a multiple account scenario**

- Each time a user wishes to customise their offline holding limit for a device, the **PSP would need to update the new holding limit to the SAP** to ensure that the overall offline holdings across PSPs are within the offline holding limit established according to Article 37.5

- Ongoing investigations on how to update a parameter in a secure element such as holding limit per device

5

Joint accounts

Joint accounts are possible in both cases…

Individual DEAN   Joint DEAN

Individual 1   Individual 2   …   Individual n

6
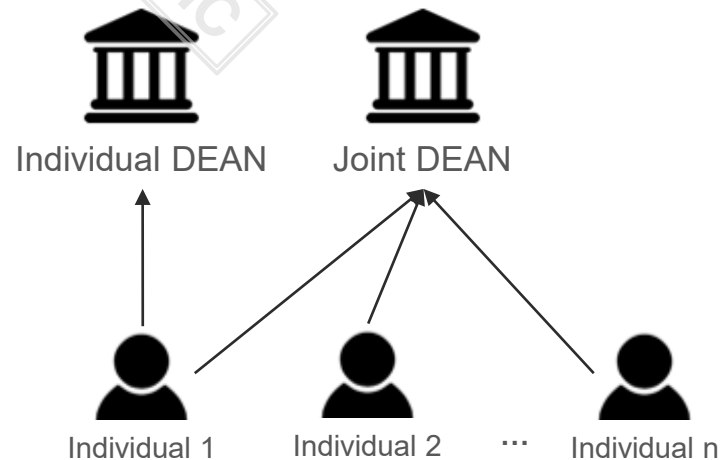
Switching vs.
Opening new account

Mitigant: 'Switch & Port' is a novel design feature that facilitates competition

● **ECB legal opinion (31/10)**

§ 9.3 - "The ECB further suggests two elements to be considered by the co-legislators regarding the proportionality of any restriction on the number of accounts. First, the freedom of PSPs to provide digital euro services would not be constrained by a limitation to one account per user. It would be easier to switch a digital euro payment account than a payment account today, since the International Bank Account Number (IBAN) is not portable. Second, the complexity for the user in managing a consolidated holding limit across multiple accounts may warrant applying a different approach at the launch of the digital euro, when people are not yet familiar with it."

Comparing value of 'switch & port' with 'add new account' from multiple perspectives:

1. User experience: Which process involves less steps?

➡️ Switch & Port
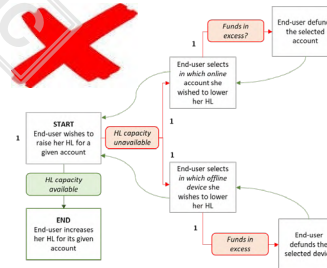
2. Value for user: What factors may lead a user to prefer one option over the other?

➡️ Benefits in both options.

3. Value for PSP: What factors may lead a PSP to actively offer users one or the other?

➡️ Switch & Port appears preferable.

Thank you!