EWC Milestone 5

End of phase 1 pilot report

Author: Gen (Avast s.r.o.)

Contributors: SICPA, Amadeus, Rockwood, VISA, UAegean, Yonder (Gen subco), iGrant.io, Signicat, ValidatedID

Date of submission: 31/10/2024

Contents

Co-funded by
the European Union

Revisions

Version	Date	Author	Changes/ process
V0.9	17-10-2024	Gen	Close to final version reviewed and agreed by contributors sent to Management Board MB can provide feedback
v1.0	23-10-2024	Gen	Close to final version sent to the wider consortium after MB and coordinators OK. EWC consortium can provide feedback
v1.1	29-10-2024	Gen	Final version sent to EWC coordinators, ready for sharing with HADEA

Executive Summary

This report summarizes the approach, learnings and findings from the EWC project work package 2 (WP2), after the first phase of piloting the EUDI wallet in travel and payments scenarios. The overall EWC project objective is to test available issuer, wallet and verifier technologies in value adding use cases and moreover to explore critical drivers for adoption of the EUDI wallet (e.g. EU citizen appetite and business incentives).

At proposal writing (2022), WP2 planned to pilot pre-production ready infrastructure towards the end of the project. Therefore, we aimed for 10.000 natural person wallet users and 20.000 transactions at project completion. This report, however, covers only phase 1 of the project, which is about "Getting the Identity basics right", meaning: piloting EUDI wallet supported identification in context of travel and payment scenarios, in remote flows, with a few hundred fans and project members, in a mocked environment and, and with dummy data.

Starting the project, WP2 dove into relevant policies, regulations and standards that affect our usage scenarios in one way or the other to understand the context in which the use cases take place, and learned that regulations are important to drive EUDI wallet adoption. For example:

- New regulations ([border checks](), [tackle terrorism and serious crime]()) on the collection and transfer of Advanced Passenger Information or border management purposes, and on the collection and transfer of API for law enforcement purposes introduce an obligation for air carriers to use "automated means of collection" (e.g. an EUDI wallet).
- The eIDAS2 regulation is the main driver for the adoption of the EUDI Wallet to authenticate online payments.

In parallel to the regulatory content exploration, and with the aim to uncover the value of the EUDI wallet for the end-user. We confronted 2.060 EU citizens across 9 countries with the EUDI wallet concept and asked for their feedback. We learned that:
- Europe isn't one country. Perceptions differ based on social and geographical background. Thinking global, but acting local is important when communicating or implementing the EUDI wallet.
- Perceptions range from "this is the best thing I ever" to "this terrifying government overreach"
- The EUDI wallet is perceived as vulnerable "because you have all your eggs in one basket". Citizens do not necessarily understand the concept and the benefits of decentralized data.
- The EU is seen as an important driver for harmonization of usage across Europe.
- Existing institutions like banks are trusted over new actors to provide an EUDI wallet, Apple is trusted the least.

Eventually, WP2 selected, built and implemented three travel scenarios (mocked user journey) and two payment cases (video journey) to pilot the EUDI wallet, being:

Using the EUDI wallet,
- for the automation of the collection of Advanced Passenger Information (APIS) during airline check-in.
- to register for ERUA workshops and book of Cyclades Fast Ferry tickets
- for online age verification when buying a ticket for the Buda Castle museum
- for merchant triggered SCA with age verification during online shopping
- for QR code vending machine age verification when buying product of age

From the end-user pilot with 100+ people (being an EWC consortium member or a fan) we learned that participants were positive about both the experience and EUDI Wallet in general. The pilot highlighted benefits to explore further such as: efficiency, accuracy and security and participants recognized that without improved UX/UI this may fail. User recruitment and engagement proved to be challenging. The #1 cited reason for lack of engagement was the time commitment required to complete the pilot. This has implications for Phase 2, where participation needs to be much higher.

In conclusion, phase 1 demonstrated to be successful in getting meaningful results that help improve the EUDI wallet proposition and laying the groundwork for further exploration and piloting in the next phases (2 & 3). However, for the continuation of meaningful and quality results and to deliver towards our KPIs in the best possible way, the pilot approach for phase 3 needs to be amended.

Finally, yet important, there is a shared belief that for eDIAS ecosystem to become successful, more attention and resources must be put on the overall business model, business incentives (not only for issuers, but also for verifiers) and wallet user experience.

List of abbreviations

Acronym	Explanation
(Q)EAA	(Qualified) Electronic Attestation of Attribute
EAA	Non-Qualified Electronic Attestation of Attribute
Pub-EAA	Public Body Electronic Attestation of Attribute
ACM	Access Control Mechanism
ARF	Architecture and Reference Framework
CBOR	Concise Binary Object Representation
CIR	Commission Implementing Regulation
COSE	CBOR Object Signing and Encryption
DTC	Digital Travel Credential
EDIR	European Digital Identity Regulation
eID	electronic Identification
eIDAS	Electronic Identification, Authentication and trust Services
ETIAS	European Travel Information and Authorisation System
EUDI	European Digital Identity
F2F	Face-to-Face
FAQ	Frequently Asked Questions
FAR	False Acceptance Rate
FRR	False Rejection Rate
IBAN	International Bank Account Number
ICAO	International Civil Aviation Organization
ISO	International Organization for Standardization
JOSE	JSON Object Signing and Encryption
JSON	JavaScript Object Notation
MRTD	Machine Readable Travel Documents
NFC	Near Field Communication
PAD	Presentation Attack Detection
PAN	Primary Account Number
PID	Person Identification Data

Co-funded by
the European Union

Acronym	Explanation
QC	Qualified Certificate
QES	Qualified Electronic Signatures
QSCD	Qualified Signature/Seal Creation Device
QTSP	Qualified Trust Service Provider
SD-JWT	Selective Disclosure for JWTs (JSON Web Tokens)
SOG-IS	Senior Officials Group - Information Systems Security
T&Cs	Terms and Conditions
TSP	Trust Service Provider
WP	Work Package

Reader guide

This end of phase report captures the results of piloting WP2 phase 1 travel and payment usage scenarios. It is drafted in accordance with Grant Agreement Milestone 5 (M5): "Pilot 1: Getting the Identity basics right". The targeted audience for this report and its annexes is all organisations that are directly or indirectly linked to the EWC Consortium Agreement, HADEA and the EU Commission and its purpose is to communicate to all interested project partners and stakeholders what we did, what we learned, what our challenges are and our readiness to move to the next phase of piloting.

The next section is the **management summary** emphasizing the key elements we want to communicate. The report starts with an **introduction** repeating the objectives we set in the project's proposal phase and describes the approach we defined early in the project to reach those objectives. It then covers the three stages we have been trough in the first 1.5 year of the EWC project, being:

- **Exploration:** We explored the travel and payments usage scenarios for this first phase of piloting and selected them in line with our project objectives and their expected business value. In parallel, we dove into relevant policies, regulations and standards that affect our usage scenarios in one or the other way and simultaneously started to uncover the value of the EUDI wallet by asking EU citizens about their thoughts when confronted with the concept.
- **Builds:** Five usage scenarios, three focussed on travel and two on payments, have been prioritized, designed and built out either into a technical solution or an animation. This section covers the technology context in which the usage scenarios have been developed and provides a comprehensive description of each usage scenario including the business rationale and a SOTA (State of the Art) analysis.
- **Experience**: We've tested and piloted the usage scenarios we built with employees of consortium companies and selected participants linked to the participating companies and Fans. This section describes our pilot approach, our findings and formulates learnings and recommendations for the next phase of piloting.

The report ends with a **concluding section** that summarizes our findings and looks ahead to what is **up next.**

1. Introduction

1.1 WP2 objectives

In eIDAS, much focus is on legislation and technology. For the success of the initiative, it's equally important to understand the drivers for adoption. The LSP projects are helpful mechanisms to explore critical drivers for adoption like EU citizen appetite and business incentives. Next to validating wallet technology usefulness, exploring citizen appetite and business incentives in context of travel and payment scenarios are at the core of the EWC WP2 objectives.

Objectives:
- Demonstrate how an EUDI Wallet can improve and automate manual processes for people, organizations, and governments related to travel and payments.
- Demonstrate how travel and payment services contribute to the adoption of the EUDI Wallet
- Explore how payment services can benefit from using the EUDI Wallet.
- Explore the value of the EUDI wallet with EU citizens.
- Explore trust. For example: How do we give citizens the confidence to interact online by securing the user journey and verifying that they are dealing with genuine organizations, not scammers?
- Explore challenges to interoperability across Member States (and 3rd countries).
- Make the EU more attractive as a travel and tourist destination and enhances inter-EU
  Commerce.

In addition to the objectives, KPIs were defined to measure the success of the project. The KPIs listed in the Grant Agreement that WP2 is responsible for are the number of "natural person wallet users" and the number of "completed transactions".

Based on the Connect Europe Facility (CEF) call requirements for the LSPs we planned to accommodate the pilot for a pre-production ready infrastructure. Meaning towards the end of the project a close to ready ecosystem that could go into production by just "switching the button" including real issued wallets, real issued PIDs and other credentials that could be verified by RP with integrated back-end systems and real people. Therefore, at the time of proposal writing, we aimed for 10.000 natural person wallet users and 20.000 transactions at project completion.

1.2 WP2 structure and approach

To achieve the above mentioned objectives, and to work towards the KPIs, WP2 is split into 4 tasks that drive the specifications and developments of the travel and payment usage scenarios to be tested and piloted with the EUDI wallet.

Task 2.1 - Define travel Journey & issue and verify travel credentials establishes the use of the EUDI Wallet that supports PID and travel credentials as means of identification and as means of sharing and storing relevant user credentials, and demonstrates how this adds security, convenience, and business value at the various touchpoints of the travel journey.

Task 2.2 - Issue payment credentials and make payments. The task issues payment credentials and makes payments. It covers card and account payments for consumer and business users and leverages technologies such as tokenization and payment wallets. The EUDI Wal-

let could be used extensively for user identity validation (IDV), strong customer authentication (SCA), and electronic signatures as well as to hold payment credentials for cards and accounts. Furthermore, the task explores authentication options such as delegation in line with PSD2, Signed Payment Requests, and other authentication methods to ensure a seamless user experience and minimize fraud.

Task 2.3 Run End User pilot and collect End User Feedback. This task designs the end-user pilot, drives end-users recruitment and engagement, runs the pilot itself, and analyzes the results. T2.3 captures EU citizen feedback and to a reasonable extent evaluates feedback from issuers, wallets and relying parties. Each pilot phase will provide feedback and recommendations for the project to improve and enhance the use case, technology, and processes. This task is all about representing the voice of the EU citizen, a crucial aspect to understand for an effective EUDI wallet adoption strategy
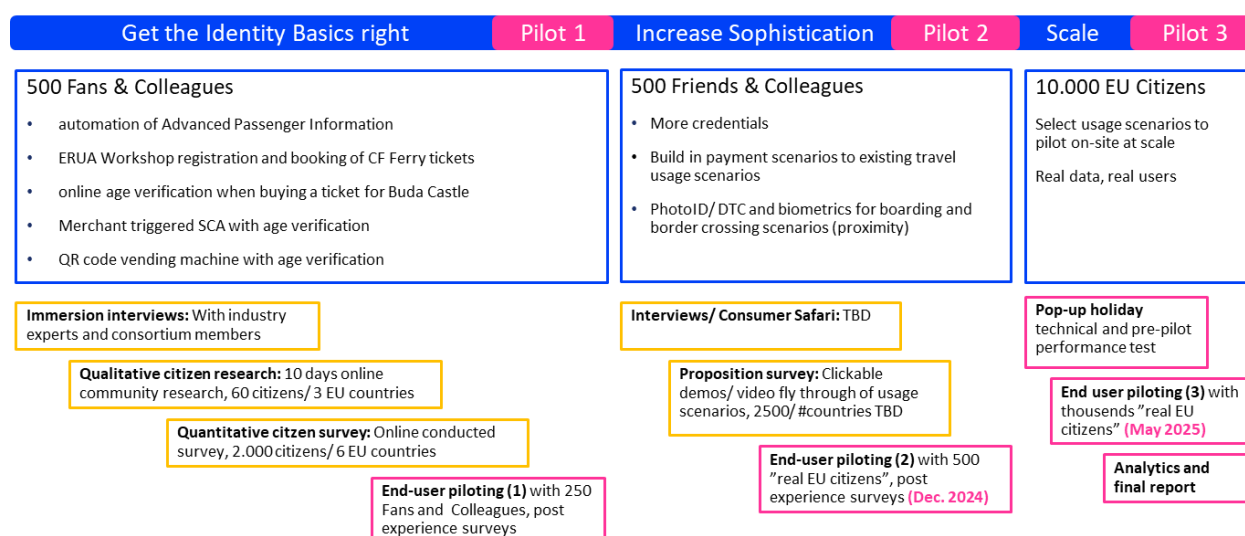
Task 2.4 - Define and onboard more Relying Parties. This task recruits and onboards issuers and relying parties that are essential to deliver the end-to-end travel journey.

To improve the piloted EUDI wallet solutions in an optimal way, increase the confidence in our learnings and allow ourselves flexibility during the project we decided to take a phased EUDI wallet solution, usage scenario and pilot approach resulting in three phases:

Phase 1: Getting the Identity basics right. To pilot EUDI wallet supported identification in context of travel and payment scenarios in remote flows with a few hundred fans and colleagues in a mocked environment and with dummy data.

Phase 2: Increasing sophistication by adding more credentials (e.g. tickets, payment creds.) to the mix and to pilot EUDI wallet supported credential exchange in context of travel and payment scenarios in remote and proximity flows with a few hundred fans and colleagues in mocked environment and with dummy data.

Phase 3: Scale by selecting the most promising EUDI wallet supported travel and payment scenarios and to pilot them with thousands of EU citizens in a pre-production environment with real data.

Get the Identity Basics right	Pilot 1	Increase Sophistication	Pilot 2	Scale	Pilot 3

500 Fans & Colleagues	500 Friends & Colleagues	10.000 EU Citizens
• automation of Advanced Passenger Information • ERUA Workshop registration and booking of CF Ferry tickets • online age verification when buying a ticket for Buda Castle • Merchant triggered SCA with age verification • QR code vending machine with age verification	• More credentials • Build in payment scenarios to existing travel usage scenarios • PhotoID/ DTC and biometrics for boarding and border crossing scenarios (proximity)	Select usage scenarios to pilot on-site at scale Real data, real users

Immersion interviews: With industry experts and consortium members

Qualitative citizen research: 10 days online community research, 60 citizens/ 3 EU countries

Quantitative citzen survey: Online conducted survey, 2.000 citizens/ 6 EU countries

End-user piloting (1) with 250 Fans and Colleagues, post experience surveys

Interviews/ Consumer Safari: TBD

Proposition survey: Clickable demos/ video fly through of usage scenarios, 2500/ #countries TBD

End-user piloting (2) with 500 "real EU citizens", post experience surveys **(Dec. 2024)**

Pop-up holiday technical and pre-pilot performance test

End user piloting (3) with thousands "real EU citizens" **(May 2025)**

Analytics and final report

This report embodies the completion of **phase 1** and presents its **approach** and **results.**

2. Exploration

WP2 explored the travel and payments usage scenarios for this first phase of piloting and selected them in line with our project objectives and their expected business value. In parallel, we dove into relevant policies, regulations and standards that affect our usage scenarios in one or the other way and simultaneously started to uncover the value of the EUDI wallet by asking EU citizens about their thoughts when confronted with the concept.

2.1 Policies, regulations & business drivers

Travel policies and regulations

For the test scenario "Airline Advance Passenger Information",

Airlines have to comply with an important number of regulations that often require them to collect and share passenger information with different authorities. In order to simplify and standardize these procedures and which data airlines have to collect, the World Custom Organisation (WCO), International Aviation Trade Association (IATA) and the International Civil Aviation Organisation (ICAO) have jointly published the "Advance Passenger Information Guidelines". The document describe the Advance Passenger Information (API) and their benefits as follows:

> *API involves the capture of a traveller's biographic data and their flight details by the aircraft operator prior to departure and the transmission of that information by electronic means to the Border Control Agency in the departing and (or) destination country. API can be a necessary decision-support tool that Border Control Agencies use to detect a person of interest or person requiring examination in advance of the intended travel, departure, arrival, or transit . Before passengers are cleared for boarding or processed for entry/transit in a destination country, API is sent to the Border Control Agency (or Agencies) for screening against the relevant databases to identify passengers and crew of interest, including those subject to UN Security Council sanctions lists and travel bans, and to identify stolen or lost travel documents, including those listed on the INTERPOL SLTD.*

These guidelines have been enshrined into EU law by the Council Directive 2004/82 which stipulates the following:

> *Art.3*
> *1. Member States shall take the necessary steps to establish an obligation for carriers to transmit at the request of the authorities responsible for carrying out checks on persons at external borders, by the end of check-in, information concerning the passengers they will carry to an authorized border crossing point through which these persons will enter the territory of a Member State.*
>
> *2.   The information referred to above shall comprise:*
>
> *the number and type of travel document used,*
> *nationality,*
> *full names,*
> *the date of birth,[…]*

The current directive do not stipulate how this personal information should be collected and at the moment it is common practice for this information to be collected either at the airport by swiping the travel document or it is manually typed during the airline online check-in processes. This last process is often source of problems and discrepancies which can result in denied boardings or denied entries for the passengers and fines for the airlines.

10

Moreover, in 2021 the European Commission has proposed to revise the current API Directive and replace it by two regulations: one on the collection and transfer of API for border management purposes, and another on the collection and transfer of API for law enforcement purposes.

These 2 proposed regulations increase the scope of the flights concerned by the collection of the Passenger data and introduce and obligation for air carrier to use "automated means of collection":

> *Art.5 Where air carriers provide an online check-in process, they shall enable passengers to provide API data referred to in Article 4(2), points (a) to (d), by automated means during this online check-in process. For passengers that do not check-in online, air carriers shall enable those passengers to provide those API data by automated means during check-in at the airport with the assistance of a self-service kiosk or of airline staff at the counter.*

And then stipulate that :

> *3. Any automated means used by air carriers to collect API data under this Regulation shall be reliable, secure and up-to-date. Air carriers shall ensure that API data is encrypted during the transfer of the data from the passenger to the air carriers.*

We believe that the EUDI Wallets could represent an ideal and privacy preserving solution for airlines to collect Passenger data as requested by the regulations mentioned above and therefore proposed to test the usage of the wallets for this purpose.

Payment policies and regulations

As defined in the Article 5f.2 of the new eIDAS2 regulation that entered into force on the 20th May 20242, private relying parties such as banks shall also accept the use of European Digital Identity Wallets for strong user authentication. The Regulation also states an intention (Recital 62) that the regulatory requirements will support strong customer authentication requirements for online identification for the purposes of initiation of transactions in the field of payment services.

Regardless of the ongoing formal legislative approval process, or additional regulatory clarity on these provisions being given, we assume that banks will have to offer the EUDI Wallet to their customers as an alternative method to perform SCA for online banking login and online card or account payments by the 21st November 2027 (36 months after the publication of the first Implementing Acts expected on the 21st November 2024), and that the EUDI Wallet must be able to perform strong customer authentication (SCA) for online payments in compliance with:

- the European Union (EU) Payment Service Directive 2 (PSD2) and Regulatory Technical Standards on Strong Customer Authentication and Secure Communications (RTS on SCA) and, as it becomes in effect,
- the EU PSD3, the Payment Service Regulation (PSR) and the to be updated RTS on SCA.

According to the above regulations, the application of SCA is required on every online payment transaction unless the transaction is out of scope or exempted. It requires that the payer is authenticated through at least two factors, each of which must be independent from the other, from two of the three categories listed below:

- Something the payers know (knowledge factor, e.g. a PIN code)

- Something the payer has (possession factor, e.g. a mobile phone)
- Something the payer is (inherence factor, e.g. biometric)

SCA takes place at the end of the shopping experience when the final amount of the basket is known and is ready to be paid. It must be a smooth user experience for both the payee (e.g merchant) and the payer, balancing security with convenience while being compliant with the Architecture and Reference Framework (ARF) and the payment regulations quoted above.

The payer's Payment Service Provider (PSP) is responsible for SCA compliance, ensuring that the two-factor authentication is correctly performed. If SCA cannot be completed (too long, too complex, fails) the payment transaction is declined by the payer's PSP, resulting in the payer not purchasing their desired goods/services and the merchant not converting the sale.

The eIDAS2 regulation is the main driver for the adoption of the EUDI Wallet to authenticate online payments. Beyond regulation, by injecting identity attributes in the payment transactions, the EUDI Wallet could bring innovative journeys that could drive usage (e.g authenticate for payments and verifying the age in a single step).
Beyond the regulatory obligations, we are also exploring the possibility for the EUDI wallet to hold payment credentials (card or IBAN tokens) and get a share of the payment value chain.

2.2 EUDI wallet value proposition

Before piloting the EUDI wallet in context of the phase 1 usage scenarios we decided to define the value exploration areas of the EUDI wallet first. Therefore, we held a series of immersion interviews (30 total) with key project stakeholders and established core assumptions and research objectives, being:

- Value proposition
    - Assumption: People don't actually care about the use of their data, the wallet must present clear user benefits beyond this privacy.
    - Research objective: Understand the end user response to the EUDI Wallet value proposition.
- Trust landscape
    - Assumption: Users trust different entities with different types of data and 'use cases' i.e., government responsibility to protect identity/ official documents, banks best placed to secure payments.
    - Research objective: Gain a thorough understanding of the EUDI Wallet trust landscape and how this impacts attitudes and adoption.
- Category context
    - Assumption: Market leaders Apple and Google have established category norms that users expect in any type of digital wallet.
    - Research objective: Explore how the current digital wallet/ identity category context impacts response and reaction to EDIW.
- User Experience:
    - Assumption: The user experience/ interface must be beautiful, simple and seamless otherwise you will immediately lose users
    - Research objective: Understand the ideal end user experience. Explore the customer journey during adoption, use and retention.
- Barriers to adoption:
    - Assumption: Users have a multitude of security and usability concerns regarding this step change in identity infrastructure that will act as a barrier to adoption

o   Research objective: Understand the barriers to EUDI Wallet adoption

Subsequently we investigated those assumption in three sequential exploration activities:

Firstly, we conducted a mini pilot with 40 Greek students trialling an early version of the EU-DI wallet at the AnimaSyros event in September 2023 and learned in terms of user experience and usability that:

- **"All in one"** (i.e. credentials, e-tickets etc. all in one app) is a top benefit space of digital wallets not only for users, but also for verifiers.
- **Students expect single device flow**. Having to switch between devices was the most common pain; single devices [mobile deep link, tap notification etc.] flow most requested change. In app, ordering or categorisation of credentials / e-tickets is preferred to current UX

Secondly, we ran an in-depth 5-day online community research with 60 EU citizens across 3 EU countries (Sweden, Greece, Netherlands) and learned in terms of of value proposition, trust landscape, category context and barriers to adoption that:

- **There is a varied response to the EUDI Wallet across countries**, but for the majority of citizens EU involvement provides a positive halo for the wallet.
- **Citizens need a clear and compelling reason to use the EUDI wallet** that outweighs the perceived risks.
- **Adoption of the EUDI wallet will be a journey**, where citizen choice and a careful balance of security and UX must be delivered.
- **EU citizens do not necessarily understand the concept of the EUDI wallet** and especially the concept of decentralized data. Clear and extensive communication about the EUDI wallet will be key.

Thirdly, we conducted a survey with 2.000 respondents (EU citizens) across 6 EU countries (Finland, Denmark, Ireland, Germany, Hungary, Poland - equal spread over the Digital Economy and Society Index (DESI)) and learned in terms of value proposition, trust landscape, category context and barriers to adoption that:

- **The EU should not be considered a single bloc for digital services.** From digital maturity, sovereignty, EU political unity etc., each EU member state has a distinct "tapestry" that shapes its citizens' reaction to both EUDIW, and trust in the entities involved (i.e., local Government, EU, private firms). "Think global, act local" launches are required to maximise citizen adoption.
- **The EUDIW polarized citizen opinion.** From optimism about a new digital age and societal impact, to others content with analogue solutions. From pro-EU, to cynical of EU-involvement. This polarisation was most acute in Denmark and Germany. Use this report to reduce inertia for those markedly undecided or closed to EUDIW adoption.
- **Common access to services across EU borders is valuable to citizens.** Common access to services across EU member states (e.g., medical services when abroad) were valuable to citizens, more than the use cases already solved for (e.g., payments) or are only minor pains (e.g., hotel check-in). Prioritise use cases that provide citizen value > incremental value.
- **The central security tenets are obscure, and at worst lead to alarm.** There is no understanding about decentralized data, or selective attribution. Instead, some citizens see EUDIW as a security risk: it's "All Eggs in One Basket" at best, and Government overreach / EU "big brother" at worst. The convergence tension needs to be resolved; "change the play, or the actors".
- **There are usability concerns that citizens have started to paint.**

- o "Disconnection Anxiety" (e.g., battery loss, no Wi-Fi availability).
- o "Digitally Excluded" (e.g., access and usability concerns); most notable in Northern EU member states, C. expect UI "as good as" from Big Tech.
- o Technology solutions (e.g., offline mode, superior UI etc.) and reassurances in comms needed to minimise these.
- **EU citizens trust financial institutions as EUDI Wallet providers.** The bank and card issuers are most trusted by citizens, where EUDI wallet providers would need endorsements as an unknown. Apple least trusted, though more trusted amongst install base. Trustmark's are expected. EUDI wallet providers would need endorsements or to white-label solutions for banks to maximise trust.

3. Builds

Balancing business rationale, active member organizations in the Consortium and technology availability we prioritized five usage scenarios. Three of them focussed on travel and two on payments.

The three travel scenarios below have been designed and built out into a technical solution. Using the EUDI wallet
- for the automation of the collection of Advanced Passenger Information (APIS) during airline check-in.
- to register for ERUA workshops and book of Cyclades Fast Ferry tickets
- for online age verification when buying a ticket for the Buda Castle museum

The below two payment scenarios have been designed and captured in animation:
- Merchant triggered SCA with age verification during online shopping
- QR code vending machine age verification when buying product of age

This section covers the technology context in which the usage scenarios have been developed and provides a comprehensive description of each travel and payment usage scenario including the business rationale and a SOTA (State of the Art) analysis.

3.1 ARF and Reference Wallet

Due to the delays of the ARF and the Reference Wallet Implementation, discussion took place on the standards and possible way forward having taken into account the requirements of the different usage scenarios from WP2. Consequently, the project decided to take an RFC led (published in EWC GitHub) approach and establish an Interoperability Test Bed (ITB).

3.2 EWC interoperability, testing & technology choices

In EWC, designing, developing and implementing travel and payment scenarios for piloting relies on cross-WP cooperation. WP2 uses the results produced by WP3 (wallets and dummy PID & Passport in phase 1) and WP4 (issuer, wallet verifier, interoperability and testing) and implements them specifically on its travel and payment scenarios driven by relying party demand.

WP4 established a working methodology to support interoperability and compliance with relevant regulations of solutions being implemented by EWC participants. Since the standards relevant in this area are rapidly changing driven by the impact and demand generated by the EUDI Wallet initiatives it freezes every 3-4 months the versions of the specifications that are to be used by the participants. To support the effort of testing and piloting, WP4 contributed to the definition of the initial test flows, with the goal of testing the interoperability of EWC participants' solutions to perform basic issuance and presentation of verifiable credentials.

WP3 launched an RFC compliance survey, to which issuers, wallets and verifiers could respond. The first ITB tests complying with RFCs were successfully completed for multiple wallets (done in WP4). The first version of the RFC was released at the end of April 2024, and the compliant wallets were published at EWC GitHub. The team also decided to release a library that can be reused for reference to make the interoperability easier. Android and iOS library for OID4VCI, OID4VP, SD-JWT: The first iteration was released at the end of April as planned, supporting OID4VCI/VP with JWT and SD-JWT.

All test scenarios are implemented in the ITB when the EWC RFCs are finalised. All wallets, issuers and verifiers can self-conform against the ITB for interoperability and conformance. The overview of the technical test scenarios is embedded in the EWC RFCs

3.3 WP2 phase 1 usage scenarios

WP2 selected, built and implemented three travel scenarios (mocked user journey) and two payment cases (video journey) to pilot the EUDI wallet, being:

Using the EUDI wallet,
- for the automation of the collection of Advanced Passenger Information (APIS) during airline check-in.
- to register for ERUA workshops and book of Cyclades Fast Ferry tickets
- for online age verification when buying a ticket for the Buda Castle museum
- for merchant triggered SCA with age verification during online shopping
- for QR code vending machine age verification when buying product of age

3.3.1 Airline Advanced Passenger Information (API) filling during check-in

Scenario description

As an airline passenger who has already booked a flight and is ready to check-in, I need to provide my Passport information to the airline to comply with existing regulations. After authenticating and selecting the flight to check in, I am asked to provide my passport data, different options are proposed: uploading from a file, taking a picture or "retrieve from wallet". Once the passenger has selected the "retrieve from wallet" option he is shown the possibility to select which type of digital wallet he would like to use.Once the data is shared from the wallet, then the passenger can complete the check-in flow and receive the boarding pass.

What is the business rationale behind this scenario, why was it prioritized?

As mentioned in the section concerning the regulations, passenger data collection is a requirement for all carriers proposing flight crossing state (or Schengen) borders. This process, when done on-line, require the passenger to manually type the information.This is an error prone process and these mistakes can be costly for the passenger (who might be denied a boarding or might even be rejected at the border) and for the airline (that might incur in fines and other administrative sanctions as well as pay for the repatriation of the passenger).

What makes the envisioned EUDI wallet supported journey better than the current journey (SOTA)

Automating this process through the usage of a wallet can therefore represent an important improvement for both passengers (who will not need to have the documents with them at the moment of doing the check-in and will not risk of doing any mistakes) and for the airline (which will be able to prove its compliance with the existing regulations and will reduce its liability that might come from using other solution as OCR scans).

What did we learn from implementing this scenario?

1. The pilot successfully demonstrated that wallets can be a viable method to submit passenger data to airlines, but the problem still exist of having to assure consistency between the data submitted online and the physical document that will be used by the passenger when traveling.
2. Solutions for travel actors should be designed keeping in mind passengers will most likely have a multitude of wallets. It should be possible for passenger to retrieve data from non EUDI wallets as well (at least for the scenarios with lower level of assurance required)

Pilot setup

The functionality to retrieve a passport from an EUDI wallet was integrated in an existing airline self-service check-in flow that Amadeus provide to several of its customers and more specifically into a service called Travel Ready whose purpose is to automate the data collection needs of airlines. For the pilot itself we have created a dedicated demo website connected with a dummy airline to allow participants to test an end to end flow.

Generic learnings and recommendations

1. Clarify needs for registration and geographical usability of wallet (eg can it be used outside of Europe by a Relying Party not registered in the EU)?
2. Clarify business models

Conclusion

The pilot was successful to the extent that was planned, but viability of the solution will need to be further tested using real credentials issued by different Member States to evaluate stability and possible interoperability problems

Up next: Phase 2
In Phase 2 we will enhance this flow by integrating the support of SD-JWT and therefore being able to test the selective disclosure functionalities and we will test the usage of the PhotoID credential as currently being defined by the WP2 participants.

3.3.2 ERUA Workshop registration and booking of CF Ferry tickets

Scenario Description

The Ferry Travel and Student Mobility Pilot focuses on using the European Digital Identity Wallet (EUDI Wallet) to facilitate secure and efficient participation of students in workshops across the European Reform University Alliance (ERUA) and to evaluate the wallet's capabilities in supporting Ferry Travel operations.

In this pilot, students from the University of the Aegean and other ERUA member universities use the EUDI Wallet to register for workshops by presenting their ERUA-iDs, which consist of two Verifiable Credentials: the EducationalID and the AllianceID. After registering, students receive a WorkshopTicket as a new credential in their EUDI Wallet. This ticket allows

them to access both digital resources—such as the online learning management system supporting the workshop—and physical venues.

Next, the students book their travel to the workshop venue—such as Syros Island in Greece—using their EUDI Wallet via Cyclades Fast Ferries (CFF). By presenting their ERUA-iDs, they receive special student discounts in a single interaction and can issue the Ferry Boarding Pass directly into their EUDI Wallet.

Through this use case, we explore real-world applications of the EUDI Wallet in both higher education and the travel industry. We demonstrate how students can control their personal information while accessing services and how the wallet can serve as a secure mechanism for storing tickets (workshop tickets or boarding passes). This enables the combination of these credentials with the identity credentials already in the wallet, increasing the level of assurance when accessing restricted areas, such as the ferry and the workshop venue. This aligns with the broader objective of validating and improving the EUDI Wallet by gathering real-world feedback to help the European Commission refine its specifications.

Business Rationale

The primary rationale for this pilot is to test the practical application of the European Digital Identity Wallet (EUDI Wallet) in real-world scenarios, focusing on both the ferry travel industry and higher education workshop registration within European University Alliances (UA). In the ferry travel industry, identity verification during embarkation is labor-intensive and time-consuming. Passengers are required to present physical identity documents, such as ID cards or passports, along with their boarding passes for manual verification. If tickets include discounts—such as student discounts—additional credentials like student ID cards must also be manually inspected. This manual process creates significant friction during embarkation, leading to long queues and passenger frustration, especially during peak travel seasons when ferries are crowded and weather conditions may be challenging. The inefficiencies not only inconvenience travelers but also place a burden on ferry operators, who must allocate additional staff to handle the extensive verification procedures.

Similarly, managing workshop registrations and access to resources within a University Alliance is a tedious and manual process. The verification of participants' affiliations and eligibility requires manual intervention because the IT systems of the participating institutions are often not integrated. Students must provide physical documents or multiple forms of identification to prove their student status and alliance membership. This manual verification is time-consuming, prone to errors, and places a significant administrative burden on university staff. It can lead to delays in registration, hinder students' access to educational resources, and detract from the overall educational experience.

The pilot aims to evaluate the capabilities of the EUDI Wallet in streamlining both workshop registration and ferry travel operations by combining identification credentials with digital tickets.
For Ferry Travel: Passengers can securely store and present all necessary documents—including identity verification and discount eligibility—within their EUDI Wallet. Ferry operators like Cyclades Fast Ferries (CFF) can quickly and securely verify all required information in a single interaction without the need for manual document checks. Passengers also receive their ferry boarding pass directly into their EUDI Wallet.

For Workshop Registration: By allowing students to securely store and present their ERUA-iDs—which include the EducationalID and AllianceID—within their EUDI Wallet, universities can quickly and securely verify all required information in a single interaction. This eliminates the need for manual document checks, reduces administrative workload, and accelerates

the registration process. Students receive their WorkshopTicket directly into their EUDI Wallet, granting them immediate access to both digital and physical resources associated with the workshop.

Why the EUDI Wallet-supported journey is better than the current journey (SOTA)

The EUDI Wallet-supported journey offers a transformative improvement over the current state-of-the-art by streamlining processes, enhancing security, and significantly improving user experience in both ferry travel and university workshop registration. In the existing system, passengers and students are subjected to time-consuming and labor-intensive procedures that require the manual presentation and verification of multiple physical documents—such as IDs, boarding passes, student IDs, and discount eligibility proofs. While some of these might eventually be digital (e.g. boarding pass), having to shift between physical and digital documents adds to the frustration and complexity of the process. This not only leads to long queues and delays but also places a substantial administrative burden on staff, increasing the potential for human error and operational inefficiencies.

By leveraging the EUDI Wallet, all necessary credentials are securely digitized and consolidated into a single, user-controlled platform. Passengers can present their identification, boarding passes, and discount eligibility in one seamless digital interaction, drastically reducing embarkation times and alleviating congestion. Similarly, students can register for workshops and gain access to digital and physical resources without the need for cumbersome manual verification processes. Their educational credentials are readily available and verifiable through the wallet, eliminating delays and administrative hurdles.

In essence, the EUDI Wallet-supported journey surpasses the current SOTA by delivering a faster, more secure, and more efficient process for all parties involved. It addresses the pain points of the existing system—such as delays, manual labor, and administrative burdens—by introducing a streamlined, digital solution that aligns with modern expectations for convenience and security.

ERUA Workshop Registration Process

- Register for the Workshop: Students present their ERUA-iD credentials via the EUDI Wallet to register for an ERUA Workshop.
- Receive Notification of Acceptance: Students are notified via email that they have been accepted into the workshop. They are invited to issue their WorkshopTicket.
- Issue the Workshop Ticket: Students access the workshop ticket issuer service.
- They issue the WorkshopTicket directly to their EUDI Wallet.
- Access Workshop Resources: Students present the WorkshopTicket via the EUDI Wallet to access online services associated with the workshop, such as the learning management system. They also present the WorkshopTicket to gain entry to the physical venue of the workshop.
- The technology used includes: Biometric authentication: Used to verify the user's identity when sharing credentials.
- Verifiable credentials: Tickets/Boarding passes are stored securely in the wallet and presented at the venue/ferry.
- NFC and QR codes: Provide seamless, contactless ticket verification for entry.

Key learnings from implementing this scenario

Validation of the EUDI Wallet's capabilities: The pilot successfully demonstrated that the EUDI Wallet can serve as a secure authentication mechanism in both the ferry travel and higher education sectors. By enabling the combination of different credentials, it validated

the EUDI Wallet's effectiveness as an access control mechanism in physical settings where multiple types of credentials are necessary. This approach streamlined processes and expedited service delivery, reducing manual verification steps and enhancing overall efficiency. Feedback to improve the EUDI Wallet: The pilot provided valuable feedback for the European Commission, particularly on user experience and system integration. Real-world application of the EUDI Wallet revealed insights into how users interact with the system and highlighted areas for enhancement. This feedback is essential for refining the wallet's features to better meet the needs of both users and service providers.

Enhanced Operational Efficiency: Implementing the EUDI Wallet reduced administrative burdens by automating identity verification and credential management. Ferry operators and educational institutions experienced faster processing times and decreased workload for staff, allowing them to focus on other essential tasks. This efficiency translates into cost savings and improved resource allocation.

Strengthened Security and Compliance: The pilot underscored the enhanced security features of the EUDI Wallet, including encrypted data transmission and secure storage of personal information. By adhering to EU data protection regulations, the wallet ensures that sensitive information is handled responsibly, reducing the risk of data breaches and identity fraud.
Encouragement of Cross-Sector Collaboration: By involving multiple sectors—education and transportation—the pilot fostered collaboration between different industries and demonstrated a clear improvement over the state-of-the-art (SOTA). It enabled the travel sector to verify attestations from the education sector without the need to integrate their IT systems—a process that would have been impossible due to regulatory constraints. This innovative approach not only facilitated seamless cooperation but also respected legal boundaries, showcasing how digital identity solutions like the EUDI Wallet can bridge gaps between industries while maintaining compliance and efficiency.

Additional Requirements and Industry Concerns: An important insight from the pilot was the realization that additional features are necessary for the EUDI Wallet to achieve widespread adoption, especially in the travel sector. In this industry, it's common for itineraries of ferries, planes, and other transport modes to change unexpectedly due to unforeseen circumstances. This is particularly true for the ferry industry, where weather conditions can significantly affect routes, leading to delays or alterations in schedules and even changes in arrival or departure ports.

To ensure a seamless user experience, such changes need to be promptly reflected in the boarding passes stored within passengers' EUDI Wallets. Failure to update this information can cause confusion, leading to passengers missing their departures or arriving at incorrect ports, which could deter them from using the EUDI Wallet in the future.
However, with the current technological stack used in the pilot, updating issued credentials in real-time is not possible. This limitation poses a concern for industry stakeholders, as the inability to push newer credentials to the EUDI wallet of a passenger post-issuance of the original one undermines the EUDI Wallet's effectiveness in dynamic travel environments where schedule changes are frequent. Addressing this issue is critical for gaining industry support and ensuring that the EUDI Wallet meets the practical needs of both service providers and users.

Pilot approach and setup

The pilot was carried out in two distinct stages to thoroughly evaluate the EUDI Wallet's capabilities and gather comprehensive feedback.

Co-funded by
the European Union

First Stage. Pre-Pilot Event: The initial stage was a pre-pilot event conducted by the University of the Aegean on the island of Syros. In this phase, approximately 50 real students registered for an ERUA workshop using an early prototype of the EUDI Wallet. They received their WorkshopTickets and gained access to both online and offline workshop resources through the wallet. This stage allowed for initial testing of the registration process, credential issuance, and access to educational materials in a real-world educational setting. The participation of actual students provided valuable insights into user experience, system usability, and the practical benefits of the EUDI Wallet in streamlining educational processes.

Second Stage. Comprehensive Pilot Event: The second stage was a more extensive pilot event where invited pilot testers from all European Wallet Consortium (EWC) members participated to test all EWC services comprehensively. The wallets used during this stage were provided by iGrant.io and ValidatedID, adhering to the EUDI Wallet standards to the extent that they were available at the time of the pilot planning. Pilot users were guided through the process via a specially developed website that facilitated onboarding onto their EUDI Wallets and collected user feedback for analysis. This website provided step-by-step instructions, ensuring that participants could navigate the new technology with ease. In this setting, pre-production systems of Cyclades Fast Ferries (CFF) and ERUA were utilized. These systems closely mirrored actual production environments, allowing the pilot to simulate real-world operations accurately. By leveraging these pre-production systems, the pilot could test interactions between the EUDI Wallet and service providers without affecting live operations.

Generic Learnings

User Experience is Crucial: The adoption of the EUDI Wallet hinges on providing a simple and intuitive user journey. Complex verification or ticketing processes can deter users and significantly reduce engagement. Ensuring that the wallet is user-friendly will encourage widespread acceptance and regular use.

Interoperability is Essential: The EUDI Wallet must promote a cross-industry interoperable ecosystem, as this maximizes value for users. By combining identification attributes from different sources—even during payment transactions—the wallet can support various business logics, such as applying discounts. This interoperability enhances the wallet's utility across multiple sectors and services.

Competing with Existing Standards: In ticketing and payment use cases, the EUDI Wallet's added value must be clearly demonstrated in comparison to existing wallet solutions. It should offer services that are at least equal to, if not better than, those provided by current wallets—including features like real-time updates to ticket credentials. Clearly articulating the advantages of the EUDI Wallet is critical for encouraging users to transition from established alternatives.

Recommendations for Phase 2 Enhancements

Utilize the EUDI Wallet for Payments: Phase 2 should explore integrating the EUDI Wallet as a means of payment during the booking process for ferry boarding tickets. This involves implementing merchant-led (decoupled) payment flows that allow passengers to pay directly through their EUDI Wallet. The payment process should seamlessly incorporate the verification of student IDs and other discount-eligible credentials. By verifying these credentials during the payment flow, passengers can automatically receive applicable discounts without additional steps.

Receipt Issuance: Phase 2 should enable the issuance of digital receipt credentials directly to the passenger's EUDI Wallet. In cases of business travel, receipts can also be issued to

the enterprise the passenger represents. Digital receipts as verifiable credentials improve expense tracking and reporting for travelers. Businesses benefit from streamlined expense management and easier compliance with accounting procedures.

<u>Proximity-Based Verification:</u> Phase 2 should explore the verification of boarding passes and necessary ID documents using proximity-based technologies during embarkation. Technologies such as NFC (Near Field Communication) or QR codes can enable contactless verification. Passengers can have their credentials verified automatically as they approach the ferry embarkation area, reducing wait times and queues. Ferry staff can monitor verifications in real-time, enhancing security and operational efficiency.

Conclusion

The Ferry Travel and Student Mobility Pilot effectively demonstrated the practical application of the European Digital Identity Wallet (EUDI Wallet) in real-world scenarios within the higher education and ferry travel sectors. By integrating the EUDI Wallet, the pilot streamlined processes, enhanced security, and significantly improved user experience, surpassing the current state-of-the-art systems that rely heavily on manual verification of multiple physical documents. By addressing the identified challenges and implementing the recommended enhancements, the EUDI Wallet can achieve widespread adoption and become a cornerstone of digital identity solutions within the European Union. Continued collaboration among stakeholders, refinement of features, and a focus on user-centric design are crucial to realizing its full potential. The success of this pilot serves as compelling evidence of the benefits of digital transformation, paving the way for future innovations that bridge industries and enhance the lives of citizens across Europe.

3.3.3 Online age verification when buying a ticket for Buda Castle

Scenario Description

The Buda Castle age verification pilot focuses on using the EUDI Wallet to verify the age of visitors purchasing age-restricted tickets for events and exhibitions at Buda Castle. The pilot tests how self-sovereign identity principles and the EUDI Wallet can simplify and secure the process of buying and validating tickets. Through this use case, we explore a real-world application of the EUDI Wallet to verify age while complying with GDPR, and to issue and manage tickets as Verifiable Credentials.

The main goal of this pilot is to test the EUDI Wallet's features and its ability to support self-sovereign identity, where users control what personal information they share. This aligns with the EWC's broader goal of validating and improving the EUDI Wallet by gathering real-world feedback to help the European Commission refine its specifications.

Business Rationale

The business rationale for this pilot is to test the practical use of the EUDI Wallet in a real-life scenario, for secure and efficient age verification. Currently, age-restricted ticket sales at places like Buda Castle rely on manual ID checks, which are slow, expose too much personal data, and are prone to human error.

This pilot prioritizes testing the EUDI Wallet to show how self-sovereign identity and privacy-preserving data sharing can work in a business setting. By using a high-traffic location like

Buda Castle, the pilot also provides insights into how the EUDI Wallet can improve both the user experience and operational efficiency while following GDPR and eIDAS rules.

Why the EUDI Wallet-supported journey is better than the current journey (SOTA)

The EUDI Wallet-supported journey significantly improves the current state of the art (SOTA) in several ways:

- **Self-sovereign identity**: The wallet allows users to control their own data and share only what's necessary, such as proof of age, without revealing sensitive information like birth dates.
- **Privacy protection**: Selective disclosure ensures only the necessary data (age) is shared with the ticket issuer, keeping personal details private and in line with GDPR.
- **Efficiency**: The digital process removes the need for manual ID checks at ticket booths, speeding up the process and reducing mistakes.
- **Security**: Tickets are stored in the EUDI Wallet as Verifiable Credentials (VCs), providing a secure method to manage and verify both identity and ticket information.
- **User control**: Visitors can handle both age verification and ticket management within one app, simplifying the overall experience.

Detailed pilot scenario steps and technology

1. **User ticket selection**: The user visits the Buda Castle website (VK-portal) and selects an age-restricted ticket (e.g., youth or senior discount).
2. **Age Verification**: The website requests age verification through the EUDI Wallet. The user opens their wallet, selects the appropriate age verification credential, and uses **biometric authentication** (fingerprint or face scan) to confirm.
3. **Selective disclosure**: The EUDI Wallet only shares the user's proof of age coming form the Passport or PID (e.g., over 18), without revealing unnecessary information like full birthdate or ID numbers.
4. **Ticket issuance**: After successful age verification, the system issues the user a ticket as a Verifiable Credential, which is stored in the EUDI Wallet.
5. **Ticket presentation**: Upon arriving at the venue, the user presents their ticket VC either through **QR code scanning** or **Near Field Communication (NFC)** technology, allowing contactless entry.
6. **Verification at the venue**: The verifier app checks the ticket's validity and the user's credentials, confirming both identity and ticket ownership securely and quickly.

The technology used includes:

- **Selective disclosure**: Ensures only necessary personal information (like age) is shared.
- **Biometric authentication**: Used to verify the user's identity when sharing credentials.
- **Verifiable credentials**: Tickets are stored securely in the wallet and presented at the venue.
- **NFC and QR codes**: Provide seamless, contactless ticket verification for entry.

Key learnings from implementing this scenario

- **Validation of the EUDI Wallet's capabilities**: The pilot successfully demonstrated how the EUDI Wallet can manage selective disclosure and issue Verifiable Credentials (VCs). The wallet's ability to securely handle identity verification and ticketing in a real-life setting was confirmed.

- **Feedback to improve the EUDI Wallet**: The pilot provided valuable feedback for the European Commission, particularly on user experience, system integration, and the need for standardized APIs for easier interoperability.
- **Self-sovereign identity in action**: The pilot showed that users could securely share minimal data, highlighting the practicality of self-sovereign identity in real-world situations.
- **Interoperability needs**: Ensuring smooth integration between the EUDI Wallet, the Buda Castle ticketing system, and verification apps was a challenge, underlining the importance of interoperability for widespread adoption.

Pilot approach and setup

The pilot was carried out in stages, starting with age verification and ticket issuance in a controlled setting. The wallets used were from **iGrant.io**, **DVV**, and **ValidatedID**, all under development to comply with EUDI Wallet standards. A mock ticket purchase process was used to simulate the real user journey, focusing on the wallet's core features like selective disclosure and ticket management.

- **Phase 1**: Age verification was conducted via the EUDI Wallet, and tickets were issued as Verifiable Credentials (VCs). The pilot tested scenarios where users could verify their age and present their tickets either from the same device or across different devices (cross-device scenarios).
- **Piloting**: Testing was focused on verifying the EUDI Wallet's functionality without the complexities of full integration with real-world ticketing and payment systems, allowing for rapid iteration and valuable feedback gathering.

Generic learnings and recommendations for EUDI Wallet developers

- **Generic learnings**:
  - **User experience matters**: The user journey must be simple and intuitive for widespread adoption of the EUDI Wallet. Complicated verification or ticketing processes could reduce user engagement.
  - **Interoperability is key**: The EUDI Wallet must integrate easily with third-party systems, like ticket providers and verification platforms. Standard APIs and protocols will be essential to make this possible.
  - **Privacy by design**: The selective disclosure feature works well and ensures that user privacy is protected, which is a crucial feature for compliance with GDPR.
- **Recommendations for the next phase**:
  - **Full payment integration**: Phase 2 should focus on integrating the EUDI Wallet with the real Buda Castle payment system to test the full end-to-end user experience.
  - **Proximity-based ticket validation**: Phase 2 should introduce proximity-based ticket validation (NFC, QR codes) to allow seamless, contactless entry.
  - **Scalability testing**: The pilot's next phase should test scalability to ensure the system can handle large volumes of users during busy periods at venues like Buda Castle.

Conclusion

The Buda Castle age verification pilot successfully demonstrated the EUDI Wallet's real-world capabilities, particularly in selective disclosure and Verifiable Credentials (VCs). The pilot provided key insights for improving the wallet's functionality, user experience, and integration capabilities, contributing valuable feedback to the European Commission for refining the EUDI Wallet.

Up next: Phase 2

In **Phase 2** (September 2024 - December 2024), the focus will be on:

- **Full integration with the payment system**: Connecting age verification directly to the Buda Castle payment provider (Interticket) to allow real-world transactions.
- **Proximity-based verification**: Implementing NFC or QR code-based verification for contactless, streamlined entry.
- **Issuing tickets as Verifiable Credentials**: Automatically issuing tickets as VCs and storing them in the EUDI Wallet for easy presentation at the venue.

3.3.4 Merchant triggered SCA with age verification

Scenario description

In this scenario, the consumer want to buy online an age-restricted item - a knife in our case. At checkout, he types in his card details and is then proposed to verify that he is 18+ and authenticate for payment in a single step. He confirms and the merchant website triggers the EUDI wallet where after login-in he consent with sharing the 18+ informaiton and validates the payment for the merchant and the amount.

Business rationale

The minimum requirement for a bank to be compliant with eIDAS2 is to replace one-to-one its authentication solution (most often a bank app) with the EUDI Wallet. This does not bring much value for the citizens. Instead, we have designed the "merchant-captured authentication" flow demonstrated here, that brings together identity credential (here the age) or other attestation (e.g driving license, loyalty card, …) and payments. It saves him some authentication steps and provides a better experience for online shopping.

Why the EUDI Wallet-supported journey is better than the current journey (SOTA)

Today a citizen who want to buy online an age-restricted item (eg knife, firework, alcool, …) need to prove his age with cumbersome means e.g send a scan of their ID card by email which will take 2-5 business days to be checked before the good can be shipped.
By enabling a real-time and reliable identity check online, the goods can be shipped immediately. What's More, with the innovative journey proposed in this scenario, this can be done in a single EUDI wallet call !

What did we learn from implementing this scenario?

Note that this scenario has been developed as a Figma flow only to demonstrate from a UX perspective how the user journey could look like. Payment SCA, although being described as an eIDAS2 regulatory requirement, is not included in the ARF and the team had to develop the specifications first during Phase 1.

Pilot setup

Not applicable - see above

Generic learnings and recommendations

- Participants appreciate only having to share the specifically relevant data .

This document is confidential and for EWC-internal use only
Distribution or re-usage of this document or parts of this document
outside of EWC is prohibited.

25

Co-funded by
the European Union

- Participants can see the benefits and ways a digital wallet will remove hassle
- Some participants see the EU's role in creating the wallets reassuring and a guarantee of security
- Participants identified the need for branding/ accreditation to establish trust
- Participants do not see what the difference is for EUDI Wallet payments versus existing payment methods
- Participants are concerned about the level of security, and steps to prevent misuse
- Entering payment details online is seen as a pain point where new approaches such as tokens may offer benefits

Conclusion

This UX has been shown in many meetings e.g EWC General Assembly and has gathered very good feedback. This has encouraged us in developing the specifications that will serve as the basis for Phase 2:
- SCA Implementation Guide 1.0
- RFC007 Payment Wallet Attestation

Documents can be found at EWC's GitHub website

Up next: Phase 2

We target to go live in Q2 2025 with a controlled end-to-end environment across the card payment value chain
- Bank domain: Banca Transilvania and its ACS vendor BPC
- Wallet domain: iGrant
- Merchant domain: Cyclades Fast Ferries and its PSP Worldline (tbc)

3.3.5 QR code vending machine with age verification

Scenario description

A citizen want to buy a beer at a vending machine. Alcool is an age-restricted good that requires the consumer to prove his age. At the payment step, he is asked to present his mobile phone to the payment terminal of the vending machine. He can then in his EUDI Wallet app confirm the payment and his age in a single tap.

Business Rationale

Following interest from Wallet Providers in that space, in the context of Apple now giving access to its NFC controller for third Party wallet to coexist with Apple Wallet and initiate card payments, this forward-looking Proof of Concept demonstrate how the EUDI Wallet could become an "augmented" payment wallet, holding payment and identity credentials to enable innovative checkout experiences.

Why the EUDI Wallet-supported journey is better than the current journey (SOTA)

There is today no protocol nor standard available for EUDI wallet to "exchange" with a card payment terminal in a physical store. This means that the identity proof (eg age) or attestation proof (eg loyalty card) must be presented using legacy documents like ID card. By providing a way for the EUDI wallet to leverage the payment acceptance rails, this would enable innovative new flows that would streamline the checkout and increase customer satisfaction.

What did we learn from implementing this scenario?

Note that this scenario has been developed as a technical Proof of Concept only to demonstrate from a UX perspective how the user journey could look like. It did not incorporate any of the EUDI Wallet protocols as there aren't any requirements for face to face payments in the ARF.

Pilot setup

Not applicable - see above

Generic learnings and recommendations

Same as for the above usage scenario "Merchant triggered SCA with age verification"

Up next: Phase 2
We will continue to build the specification for the wallet to become a card token requestor / payment wallet (Payment Initiation Implementation Guide 1.0) and continue to evaluate within EWC's Payment taskforce the opportunities and challenges for the EUDI Wallet providers and banks in that space.

3.3.6 PhotoID/ ICAO DTC supported by EUDI wallet

Scenario description

In 2026, European member states are going to issue EUDI wallets and new identity credentials (eg PID). The industry is requesting those member states to also issue credentials in which the Passport attributes (eg name, surname, date of birth, ID picture,…) can be used securely by relying parties as part of their regulatory obligations. While the legitimacy of such a requirement by the industry and by end-users is well recognized, the way to implement the issuance and verification of such credentials is hit by technical limitations and current legal frameworks. The aim of that usage scenario is to find piloting opportunities and actions plan to enable the implementation of such credentials within the EU and potentially abroad.

What is the business rationale behind this scenario, why was it prioritized?

Nowadays, passport attributes are broadly used by the industry (eg banks, airlines, hotels, telcos,...) to comply to national and European regulations. The relying parties have to base their assessment on the physical document which is very cumbersome for users, expensive and time consuming. While ICAO could potentially propose technical solutions and specifications for such credentials, the mandate of ICAO is to satisfy border operations and not requirements from the industry at large. Therefore, with eIDAS 2.0, the EU commission has a great opportunity to solve that issue and give tools to the industry to collect passport data while complying to GDPR regulation. Finally, a credential containing all passport attributes will be used very often by citizens which will contribute to adoption of EUDI wallet.

As the number of related transaction is very important, EWC decided to prioritize this scenario and demonstrate its feasibility in various contexts and market verticals.

Proposed solution

This document is confidential and for EWC-internal use only
Distribution or re-usage of this document or parts of this document
outside of EWC is prohibited.

27

Co-funded by
the European Union

A dedicated PhotoID credential (following ISO/IEC 23220-2/4 specifications) would be issued by the states travel document issuing authority. It would contain all passport data attributes signed individually one by one with the same certificates used for eMRTDs and as optional the unwrapped version of the passport Data Groups (namely DG1, DG2 and DG16). It would fit both border authorities and industry requirements while using both the trust framework of ICAO (PKD) and the EU Architecture Reference Framework. Indeed, for border control operations, a DTC compliant with the ICAO specifications could be reconstructed by downloading the various unchanged Data Groups from the PhotoID credential. The DTC could then be stored by the border authorities to be used in combination with the physical passport to facilitate verifications at the gate. Also, the PhotoID credential could provide relying parties from the industry (eg banks, airlines, hotels, telcos, …) means to access passport data to comply to national regulations in their domain while complying to GDPR at the same time.

What makes the envisioned EUDI wallet supported journey better than the current journey (SOTA)

As protecting borders is directly related to a country's national security, the ICAO DTC Guiding Core Principles devote rightfully much attention and great care to the ICAO DTC's data authenticity and integrity and the authentication thereof. The principles state: An ICAO DTC MUST be at least as secure as an eMRTD. To achieve this, the DTC data is signed (as a whole) by the issuing authority's public key infrastructure (PKI) and used in combination with the physical document. This design makes the DTC secure and interoperable (perfect for border crossing), but compromises data privacy and flexibility (blocking many other high value use cases in the digital travel journey, such as: online booking & check-in and seamless baggage drop, security area access, lounge access, boarding and post arrival car rental and hotel room key collection, …). In sum: the ICAO DTC Guiding Core Principles does not satisfy all current and emerging market needs from the industry, especially those related to data privacy and flexibility. Therefore, the current eMRTDs are used in a very cumbersome manner providing poor data quality for relying parties like airlines that need to check those documents as part of their regulatory requirements and leading to extremely bad user-experience for travelers and users.

By introducing the EUDI wallet, the focus around data is shifting from the provision and use of rigid digital identities to the provision and reliance on specific attributes related to those identities. As such, the revised eIDAS regulation (2.0) is addressing the privacy and flexibility market needs. Importantly, the eIDAS regulation also establishes a legal framework for the use of Person identification Data (PID) and (qualified) electronic attestations of attributes ((Q)EAA). This legal basis is essential for the adoption and appropriate issuance, use and verification of digital identity data and related attributes across Europe.

The EWC project has the ambition to bring both worlds together to create exciting digital travel journeys for travelers and to unlock business opportunities in the travel domain and broader in the industry. The most important data elements that need to be covered are persons data (e.g., name DoB, etc), passport data (e.g. document nr.) and biometric data (passport picture or other facial image).

What did we learn from implementing this scenario?

1. PhotoID credential MUST be issued only to the legitimate holder of the physical travel document (eMRTD). Therefore, during the issuance process, the user must be authenticated either with the PID of the EUDI Wallet user, and/or through a "live selfie"

Co-funded by
the European Union

of the EUDI Wallet user compared to the Data Group 2 portrait stored on the ePassport chip.
2. The issuance of the PhotoID SHOULD be done by each member states Travel Document Issuing Authority being the authentic source, having direct access to the civil registry and providing a high trust to relying parties. Alternatively, it could be issued by QTSPs with a level of assurance high.
3. The user experience is greatly improved both for on-boarding and for sharing passport attributes.
4. Users will potentially have to scan their physical passport only once during on-boarding.
5. Relying parties like airlines, ferries, banks are very interested in that solution and would trust it to streamline their operations.

Pilot setup

The overall objectives of the pilot are to demonstrate the following points:
- Attributes from the PhotoID can be shared to any relying party including: member states, border authorities within and outside of the Schengen area, airlines, airport security, hotels, banks,
- Demonstrate that attributes from the PhotoID credential can be shared in a proximity (phase3 only) and remote verification context
- Attributes from the PhotoID can be shared to any relying parties in a secure and data privacy preserving manner thanks to a selective disclosure mechanism
- Usability and pertinence of SD-JWT format for online transactions

The setup was the following (JWT):
    Issuers:
        Governments: -
        QTSPs: Infocert (IT)
    Wallets:
        Governments: Finland (DVV)
        Private: iGrant, ValidatedID
    Relying parties:
        Amadeus, Buda Castle, Cyclades Fast Ferries

Generic learnings and recommendations

- Member states should issue such PhotoID credentials from their respective Travel Document Issuing Authority, ensuring consistency with data stored on the civil registry and ensuring high-level of trust for that credential
- While PhotoID specifications are compliant with ICAO specifications on DTC, the implementation of PhotoID by EU member states should be coordinated with ICAO New Technology Working Group (NTWG). One of the objectives would be to contribute to the discussion and the definition of DTC type2.
- DGHOME, EULISA, FRONTEX should evaluate the benefits of providing a European wallet for immigrants to benefit from the same EUDI eco-system of verification.
- QTSPs should be able to issue PhotoID credentials to persons that do not have PIDs but have passports (eg children, non-EU citizens, …) with level of assurance high.
- SD-JWT format format for credentials is well suited to perform online transactions and to guarantee data privacy when sharing data attributes with relying parties.

Conclusions

From the many workshops held on the topic of PhotoID credential including representatives from EU agencies (DGCNECT, DGHOME, EULISA), from member states (Finland, Sweden, Netherlands, Hungary, Spain, Luxembourg), from the industry (SICPA, Amadeus, Finnair, VISA, Cyclades Fast Ferries, Buda Castle, IntesiGroup, InfoCert, iGrant, DigIdentity, Validated ID) and from universities (UAegen), a consensus has been reached about the need and benefits for such a credential, the feasibility of the technical implementation and the improved user experience. Therefore, we recommend the implementation of PhotoID by member states and we recommend to write an implementation rule book on that topic to align specifications across the jurisdictions and eco-systems.

Up next: Phase 2

While Phase1 was implemented on JWT format because of time constraints from ARF specifications, Phase2 will comply partially to ARF specifications by implementing all credentials on SD-JWT format. This will allow all stakeholders to adapt their technical stacks and run interoperability tests to ensure consistent implementation across the consortium. The objective for Phase3 will be to include as well mDoc format for proximity verifications.

The setup will be the following (SD-JWT):
> Issuers:
>> Governments: Finland (DVV), Luxembourg (Incert)
>> QTSPs: Intesi Group (IT), Infocert (IT)
> Wallets:
>> Governments: Finland (DVV)
>> Private: DigIdentity, iGrant, ValidatedID, Lissi
> Relying parties:
>> Airlines (Finnair), Buda Castle, Cyclades Fast Ferries

References

IATA references
1. Supplementary Information for IATA W3C VC schema for Passport (Recommended Practice 1701p)

ICAO references
2. Guiding Core Principles for the Development of Digital Travel Credential (DTC)
3. Digital Travel Credentials (DTC) ICAO-TR Digital Travel Credentials
4. ICAO 9303 Doc Series (icao.int)

ISO
5. PhotoID ISO/IEC 23220-2/4

Co-funded by
the European Union

4. Experience

The final activity of phase 1 was piloting the actual experience of usage scenarios with end users for which Gen and Yonder are responsible. Normally end-user pilots focus very much on the experience aspect like UI and UX, but for this first phase of piloting we decided to focus again more on the value proposition of the EU wallet. Consequently we designed a pilot system in which end-users were able to download one wallet and use that wallet across multiple scenarios and asked the participants to ask questions about benefits and openness to use instead of UI and UX questions.

4.1 End-user pilot setup

Based on the business rationale, relying party requirements and the availability of issuer and wallet capability and technology the phase 1 pilot* included the following actors:

Issuers	Wallets	Verifiers
UAegean (PID) iGrant.io (Passport cred.) UAegean (StudentID, AllianceID, Ferry ticket)	iGrant.io Validate-dID	Amadeus on behalf of airlines UAegean on behalf of CFF Rockwood on behalf of Buda Castle
Payment video animations were produced by Visa and Worldine		

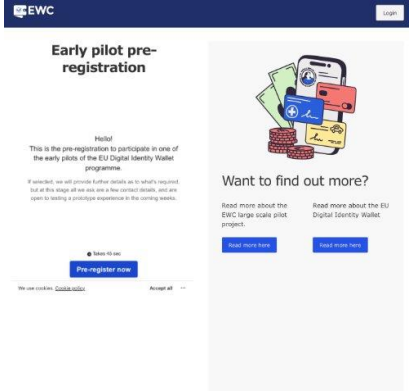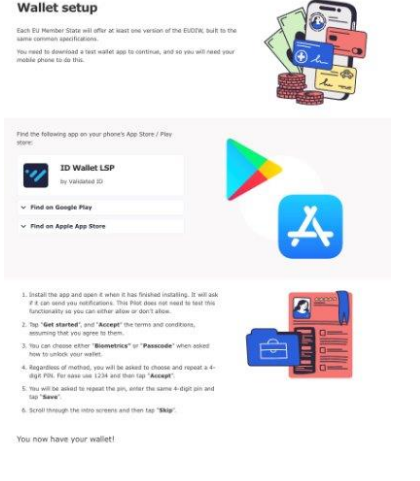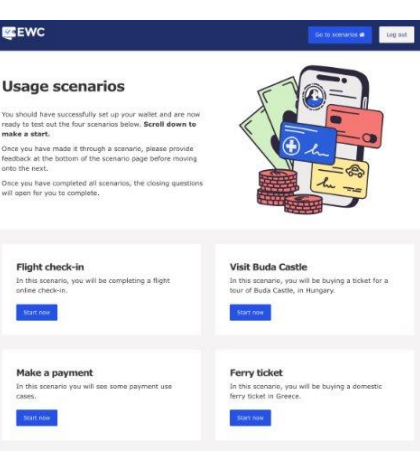*The pilot exclusively tested mocked solutions with dummy data.

The primary focus was on getting the identity basics right. This was achieved through issuing and verifying dummy PID. Once participants had accessed their dummy PID, the Pilot involved testing the experience of using the digital wallets across a number of different travel usage scenarios. Participants were invited to the Pilot through a Microsite which was also used to help steer them through the Pilot experience and to gather feedback.
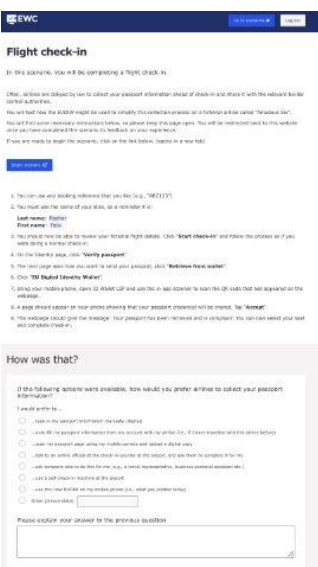
The ambition was to pilot with 500 consortium "Fans and Colleagues". Given the early stage of the pilot and related legal considerations, the participants were all employees of organizations from the EWC consortium or interested organizations linked to the Consortium Agreement. Due to this, many will be from engineering and technical backgrounds and therefore this doesn't wholly reflect wider national perspectives (which is planned for next phases).

End-user pilot goals

- Demonstrate readiness to progress to Phase 2 Pilot
- Bring confidence in the travel use case selection
- Inform the development direction of the usage scenario

End-user pilot journey

1	Participants were encouraged to register for the Pilot through a Microsite. Once signed up, they would then receive an invitation to login to their account and begin the Pilot. Throughout all stages of the Pilot, participants were guided with instructions on the Microsite.	
2	The first stage involved setting up the wallet and adding Passport/PID credentials. Participants were randomly allocated to one of the two available wallets – ID Wallet LSP by Validated ID and igrant Wallet - to ensure an even and unbiased distribution. Participants were given one of three personas: Felix Fischer, German, age: 71 Hannah Maktalainen, Finnish, age: 19 Mario Conti, Italian, age: 36 This was so that all use case needs (e.g. age verification) could be tested through the Pilot.	
3	Once participants had setup their wallet, they unlocked access to the usage scenarios. Every participant was asked to complete all of the scenarios. The four scenarios were: Completing an online flight check-in Buying a ticket for a tour of Buda Castle Make a payment (video run-through) Purchasing a ferry ticket in Greece On completion, participants unlocked the closing survey.	

| 4 | After each stage of the Pilot (Wallet Setup and Usage Scenarios) participants were requested to complete a survey detailing their experience using the wallet. The questions were designed to benchmark the experience and derive learnings for future development. E.g. How would you rank the EUDIW versus what you currently do?; What would make this experience better? Is there anything else to share with the developers?" etc. | |

4.2 End-user pilot recruitment and engagement

As we piloted early stage solutions in phase 1 we decided to limit the pool of participants to "Fans and Colleagues", meaning employees from organizations that signed the EWC Consortium agreement or from organizations that are linked to the EWC project and trusted within the community.

Furthermore, as we piloted mocked solutions in a simulated environment and used dummy data we needed to create personas. To assure quality of the results we decided to create multiple personas (Hannah, Felix, Mario) because using only one persona would always give the same outcome in for example the age verification scenario. The three personas were allocated equally over the pilot participants. Additionally, as we had two wallets to pilot with (iGrant.io and ValidatedID) we also wanted to assure equal allocation of wallets over the participants.

Because we needed to verify each participant on its eligibility and because we needed to pre-allocate personas and wallets we implemented a re-registration step for participants. During pre-registration, interested participants were asked to provide basic data about themselves to facilitate the eligibility validation process. Another advantage of asking basic data is that it could be used to correct for any inaccurate feedback. Developers of the wallets or usage scenarios could potentially be biased and favor one over the other based on their professional background.

To recruit end-users, pre-registration has been promoted during several events (EWC GA in Amsterdam, DVV webinar, and Amadeus virtual event) and through the EWC consortium channels (email and slack). After pre-registration, participants were sent login credentials to start their pilot journey. Because the journey consisted of many tasks, the dashboard allowed for saving mid-journey to get back to it later.

Eventually, out of 447 pre-registrations, 385 people were invited, 108 started downloading and configuring an EUDI wallet, and 32 went through all user journeys and made it to the closing survey. In total the pilot processed 494 credential exchange transactions, from which 260 issuance transactions and 324 verification transactions.

What	# us-ers	# transactions per scenario	# trans.
Getting started (Wallet downloads and configu-ration (PID + Passport)	108	2 (PID / passport)	216
SC01 Flight check-in (Amadeus APIS)	53	1 (check-in verification)	53
SC03 Buda castle (Rockwood Buda Castle)	49	1 (age verification)	49
SC02 Ferry ticket (UAegean CF Ferries)	44	4 (student ID / alliance ID / concession verification / issuance of ticket)	176
SC04 Make payment	42	0	0
Closing survey	32	0	0
Total	**108**	**-**	**494**

As shown in the above numbers, both recruitment and engagement were a real challenge. Surprisingly, there was a struggle to engage with the EWC consortium. With conversion from sign up to participation just 5%, suggesting that his approach is not scalable in its current form. This has implications for Phase 2, where participation needs to be much higher.

The top three reasons for invited participants to not start or complete the pilot journey were:
1. Time commitment. The time commitment required to complete the pilot.
2. Limited interest. I was only interested in a specific part of the pilot
3. Lost interest. Digital wallets are not of interest/ no longer relevant to me

4.3 End-user pilot learnings and recommendations

It's important to note that, as far as we know, we were the first LSP to actually pilot EUDI solutions in a usage scenario context.

The pilot positives

The experiences were ready to be tested (including some of the back-end). And the micro-site was an effective platform for facilitating the Pilot. 108 participants, with completion of 494 transactions. 95% of participants found it easy to download their wallet.

Overall, we got positive feedback from those who engaged. Participants recognized core benefits from the wallet and highlighted useful areas to focus on with continued development. 78% of participants rated use cases positively. Pilot User feedback: "*Good job. You created intuitive and user-friendly web pages for the tests.*"

The Pilot provided instructive steer on builds for the next phase. It highlighted benefits to explore further such as: efficiency, accuracy and security. And areas to improve on for future testing: UX / UI and in-app language, overall use case experience, and requirements for Pilot recruitment/ engagement.

Key user feedback learnings

- **Participants recognize efficiency and accuracy as benefits -** Speed, accuracy and convenience are all wallet benefits identified across the different usage scenarios. There's also an inherent universal benefit in bringing everyone across the EU up to a common digital standard. It is hard to validate the effect of cumulative efficiency benefits through Pilot testing in P1.
- **Sentiment towards the wallet's security remains mixed** - Opinions vary on the security of wallets, with specific concerns related to financial security and housing personal identity data alongside personal banking data – even amongst this audience. Security presents an opportunity, only if robustness can be demonstrated effectively.
- **Privacy, though, is identified as a point of distinction** - Commonly held EUDI Wallet strengths endorsed by participants were the separation it provides from private companies and the ability for users to take ownership of their data. "My data should be my data" –consortium participants' view that needs validating with citizens
- **Tech builds that would add further wallet value** - Participants identified potential enhancements for the wallets that could add more value. Examples include enabling bookings for multiple users and the wallet automatically applying age-based discounts. Citizens shouldn't be left feeling, "if only it could do this, it would be worthwhile using it"
- **UX needs to match/surpass incumbents to merit uptake** - The UX for wallets and use cases was identified as needing improvement. Issues include the app requesting biometric verification too frequently, and a lack of smooth integration between the wallet and use cases. Even this audience recognized that without improved UX this may fail
- **The UI and language is far too technical for general adoption** - Across the wallets, credentials setup, and use cases, there was feedback to improve the UI and language, so that it engages citizens and improves understanding. E.g. "PID" is not universally known. Simplicity of language and enhanced in-app design need greater prioritization.

Other user feedback

- **Offline modes need to be incorporated into the technology, ideally in time to be tested in Phase 3**. Citizens have flagged significant concerns regarding not having access to data when offline or the cost of using data across borders.
- **The UI needs to anticipate and be ready for all demographics, but particularly older, less technologically savvy audiences, to engage with it (or even others**

to set up for them?) Citizens are concerned that the technology may leave older people isolated because they will not have the wherewithal to utilise and operate digital wallets.

- **Further UX improvements can increase the benefit that citizens will receive.** Through the Pilot, several examples were given of where the UX can be elevated to increase the benefit of using a digital wallet versus existing technology. For instance:
  - o integrating multiple wallets when booking for more than one person
  - o automatic application of age-based pricing so you know you are paying the right fee
  - o seamless integration between camera, wallet and the use case – single device flow

The pilot learnings to take forward.

There was a struggle to achieve engagement with the consortium, with conversion from sign up to full completion just 8%, suggesting it is not scalable in its current form. This has implications for Phase 2, where participation needs to be much higher. Overall, a shorter experience is needed but also opportunity to smarten the use case piloting, in terms of what should be tested by whom. We need to make end-user recruitment/ objectives part of use case design and simplify the registration process and we need to define a clear channel strategy for recruitment e.g. involve the European Commission to support the test events.

We must improve the user's experience. A priority area of development should be enhancing the overall functionality of the wallets. Feedback was given on the importance of UX / UI for ensuring uptake and continued usage of the wallets. The Pilot feedback highlighted that the UX and UI was poor and not at the level of current wallet providers. Similarly, feedback on the use cases also highlighted UX challenges with the integration between wallets and use cases perceived to be lacking.

Prioritization of UX in the process is required. Appointing a UX lead will ensure the user is put at the heart of the Pilot experience. By improving the overall UX, this should correlate to an increase in conversion from invited participant to completion of the Pilot. Where necessary, simplify the process to align with technology constraints.

The overall experience can be optimized based on learnings from Phase 1. This includes evolving the approach to account for technology constraints. We must explore how to derive greater value from the testing environment. E.g. showcase further sources of value to citizens in use cases with better integration – payments / ticket issuance all included better understand how the wallets should be positioned to appeal to citizens through A/B testing. We also require more testing before launch to 'bulletproof' the experience with built in KPIs matrix (time to complete, relevance, accessibility, volume, maturity).

5. Conclusions

The objective of the EWC pilot is to explore critical drivers for adoption like EU citizen appetite and business incentives, by piloting wallet technology usefulness, exploring citizen appetite and business incentives in context of travel, payment and ODI scenarios.

WP2, phase 1 focussed on "getting the identity basics right" and explored and piloted EUDI wallet supported identification in context of travel and payment scenarios. After exploring the legal context and the value proposition, this was done by piloting the developed EUDI wallet solutions in remote travel and payment flows with a few hundred fans and colleagues in a mocked environment and with dummy data.

In conclusion, phase 1 demonstrated to be successful in getting meaningful results that help improve the EUDI wallet proposition and laying the groundwork for further exploration and piloting.

- The regulatory context proves to be an important driver for EUDI wallet usage scenario development. It will be important however, to increasingly focus on business benefits as eIDAS might otherwise never grow beyond a minimal viable compliance ecosystem.
- Citizen research showed that the EUDI wallet as a concept is often not on top of people's minds, misunderstood and perceived in many different ways. Attention must be paid to communicating about the EUDI wallet, bearing in mind that there won't be one message that fits all.
- A total of five travel and payment usage scenarios were successfully developed and tested with two wallets supporting OID4VCI/VP with JWT and SD-JWT
- The end-user pilot provided useful insights in EUDI wallet benefits like efficiency, accuracy and security. Participants recognized that without improved UX/UI this may fail. User recruitment and engagement proved to be challenging. The #1 cited reason for lack of engagement was the time commitment required to complete the pilot. This has implications for Phase 2, where participation needs to be much higher.

5.1 Up next: Phase 2

The next phase of piloting will focus on evolving the phase 1 usage scenarios by adding complexity. Phase 2 will not only focus on remote flows, but also on proximity flows, will add more credential to the mix (e.g. ticket, photo and payment creds), will continue to pursue further alignment with specifications in the ARF and Implementing acts, and will further investigate integrating the Reference Wallet. Next to that, phase 2 must do better in terms of end-user piloting with respect to user recruitment and user engagement. A task for everyone in the consortium to increase efforts and top up the game.

WP2 requires a slightly different pilot approach to deliver towards it's KPIs.
When defining the KPIs during the proposal phase, the EWC expected to pilot relatively mature and pre-production ready solutions with real people with real data. Real people and real data are needed to drive real use cases that can scale with thousands of end-users. Due to delays in legislation, the ARF and the Reference Implementation we will not reach pre-production and will consequently fail to onboard thousands of real EU citizens in our pilot.

To summarize our challenges:
- Even with a 4-month extension until the end of July, time is pressing. We only have 10 months left.
- No government is likely in a position to issue "real" and "legally backed" PIDs to their citizens during the lifetime of this project.

- Trust lists and where to anchor them have not been decided, nor completed
- Wallets don't support digital signing and often only a single credential protocol; SDJWT or mDL.

In addition, we need to anticipate some of the lessons learnt from the phase 1 end-user pilot.

- the challenge when it comes to user recruitment; perhaps due to limited channel use, and this will be exacerbated with P2 and P3 where there is a need to recruit users at scale
- the challenge with engagement; even consortium members and colleagues that had pre-registered interest did not complete the P1 pilot as expected (i.e. low conversion)
- UX/UI improvements; some critical user concerns should be integrated and tested in end-user testing (e.g. offline mode, retrieval of credential following device change etc.)

Therefore, we must make changes to the design of end-user pilot activities, that allow for these limitations in technology, but still deliver valuable end user insights into the EWC consortium and EC in the time available. Our "plan B" is to collapse phase 2 and 3 to run activities in parallel instead of sequential and focus more on confronting EU citizens with video examples, rather than actual tech. solutions. We will amend phase 3, remove the tech dependency and add a new workstream, namely a video programme survey.

WP2 amended proposal ("plan B"):

Pilot	Timing
Phase 3: Mature solution/ Small size user group* – testing in proximity, with real user data, and with a pre-invited/hyper-controlled user group (assume 50-100 users for now)	Q2 2025
Phase 2: Mocked solution/ medium size user group – added sophistication from P1, now adding payment and ticket issuance and storage, but again with dummy data, and with consortium members and colleagues testing through pre-existing Microsite from P1 (assume 500 users for now)	December 2024
(New) in parallel: Video program/ large size survey group – creation of an E2E (end-to-end) video "fly-through" of wallet simulation, delivered to real end-users at scale through a "survey"(assume 9,000+ users for now)	January 2025

The benefits of this approach are:
- Better change to deliver towards KPIs (wording and framing will be important)
- There are some liability issues that we could avoid, e.g., if less uncontrolled testing 'in the wild' in P3.
- Using simulated environments, there's more freedom to test a range of use cases (as no technology dependency); we can showcase further sources of value to citizens.

The downside here of course, is that we're limiting our proximity learnings to fewer users, and therefore our confidence in those (see next slide).

Co-funded by
the European Union

Plotting our usage scenario ambitions to the new pilot approach provides us with the following roadmap*:

UC lead	P3: Mature/ Small size group (50 – 100 people, real data)	P2: Mocked/ Medium size group (500 people, dummy data)	In parallel: Video program/ large survey group (9.000)
Visa & UAegean	A Romanian Citizen client of BTRL studying in a Greek University want to buy a CFF ferry ticket to visit Cyclades Islands - April 2025, 1 month		
Rockwood	Proximity-based verification process for ticket validation and age verification at the venue entrance – April 2025, 1 month	Evolve Buda Castle scenario with payments + ticket issuance December 2024, 1-2 months	
UAegean		Evolve CFF scenario with payments, receipts and ticket issuance December 2024, 1-2 months	
SICPA		Issue PhotoID November 2024, 1-2 months	
Amadeus	Amadeus and Finnair frequent flyer members. Test the wallet functionality with airport check-in experience - April 2025, 1 month Consume PhotoID creds to populate proximity verification of photoID at boarding - April 2025, 1 month	Verify PhotoID December 2024, 1-2 months	
Gen			Survey across variety of different key factors January 2025, 4-6 weeks

*From an end-user pilot perspective, we cannot serve all usage scenarios on the roadmap as we must respect resources and quality. We need to align and prioritize the scenarios, as:
- We have the capacity to serve one "Mature solution/ Small size user group" option – Phase 3
- We have the capacity to serve one "Video program/ large size survey group " option – new parallel activity
- We need to keep the "Mocked solution/ medium size user group" option as simple as possible. More usage scenarios = more complexity = more engagement challenges (as we learned from P1) – Phase 2