Data Sovereignty in use for the common European mobility data space - Proof Of Concept

DIGIT.B2 - Interoperability.

interoperable
europe

Agenda

01 Context and Purpose

02 Role of Solid and focus on the SDK

03 Application Scenario Demonstration

04 Future Outlook

Acknowledgements

Quest and Inception

A component to deal with **personal data** exchange among the actors of the common European mobility data space (EMDS), with the objectives of:
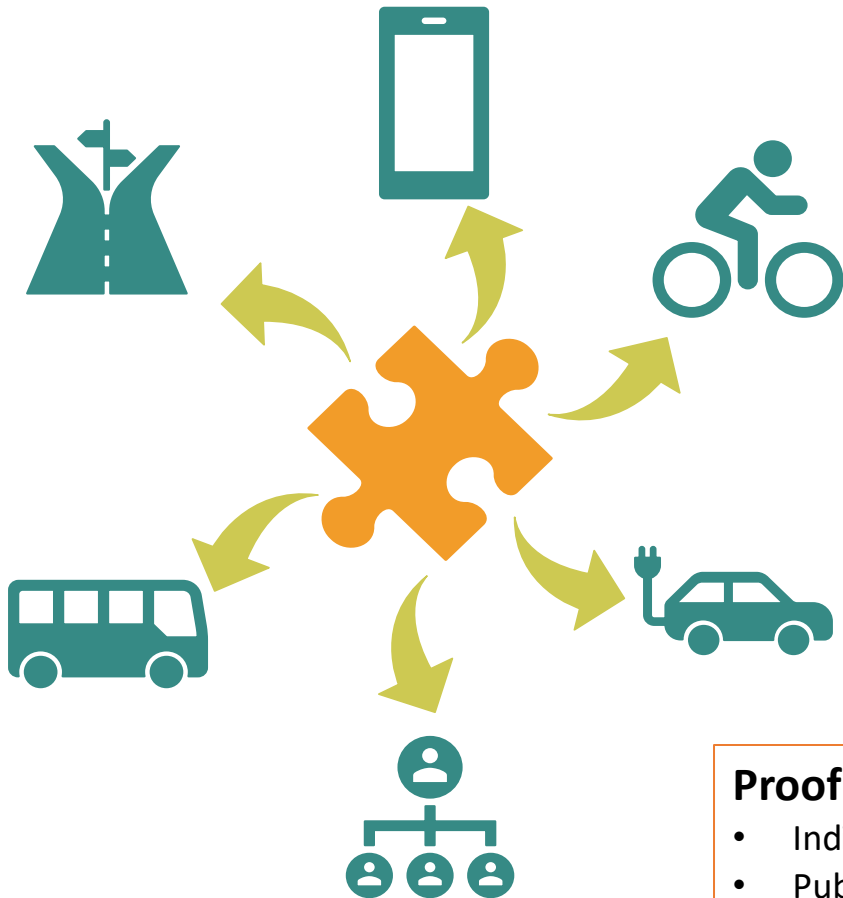
Ensuring universal compliance with the regulatory framework (e.g., Data act, Data governance act, GDPR, AFIR, etc.)

Facilitating individuals' control over their personal data

Enabling collaboration and creating value for mobility service providers

Proof of Concept Actors:

- Individual Commuters
- Public Transport Authority (PTA)
- Public Transport Operator (PTO)
- Transport Infrastructure Manager (TIM)
- Infrastructure Operators (IO)
- Service Providers (SP)

Devised Use Cases

Commuters

A service provider builds an app to issue **personalised travel recommendations** relevant to their commuting patterns, and based on:

> Disruptions and changes affecting their commute on specific days and times

> Personal data provided by the commuters

Commuters can:
- Be informed by their service providers about disruptions and changes that might interrupt their modes of transport
- Receive personalised travel recommendations (e.g. alternative modes of transport)
- Share data of personal mobility patterns while keeping control on how it is used

Mobility Actors (PTA/PTO/TIM/IO)

Improve their **mobility service offering** based on the analysis of anonymous personal mobility data provided by commuters

Mobility Actors can:
- Inform specific commuters about relevant disruptions and changes on the transport network according to their commuting patterns (e.g., road works, strikes, dynamic LEZ, schedule changes, availability of charging points)
- Be informed about the patterns of commuters to:
  - adapt the mobility and transport offer (e.g., number or frequency of trams or buses)
  - make infrastructure adaptations (e.g., car or cycling lanes opening/closing, further installation of charging points)

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Core Aspects

Control and exercise the **right to grant and revoke consent** for the use of personal data

Control that personal data is **not used beyond** the **original intention** for the provision of service

Control that personal data is **not post-processed** or **transferred** to third parties **without consent**

Control **data lifecycle** and **reverse** the original consent

Control which services **use personal data** and under what **terms and conditions**

Provide **identity verification** and ability to **sign up** for multiple mobility services

Decentralization of the **personal data storage**

Minimal footprint for **compatibility** with data exchange mechanism across the participants of the EMDS

Systematisation of the **European legislation** on the matter of handling personal data:
- GDPR
- Data Act
- Data Governance Act
- AFIR

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Design and Technology Decisions by SEMIC

 Promote the component/building block representing "**Data Sovereignty and Trust**" originating from the **DSSC-blueprint**

Incorporate aspects of semantic interoperability designing a data model that adopts **SEMIC** data specifications.

 Design the PoC taking into account the definitions of **IDSA-roles** related to data exchange

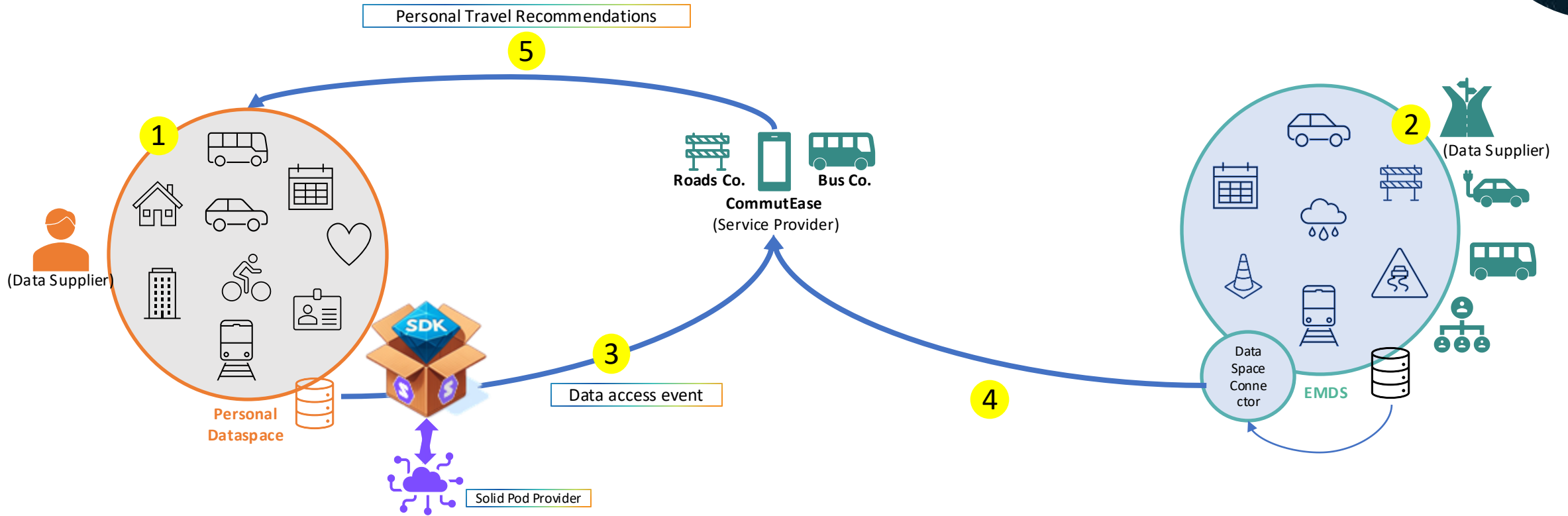Adopt **SOLID** as a facilitator to develop the PoC in a scenario of multimodal mobility

 Ensure that any entity/actor assigned a role within a data exchange context is
- Bound by its ability to own, host, process, or transfer personal data
- Exhibiting behaviour that reflect the systematisation with the regulatory framework

Deliver the "Data Sovereignty and Trust" building block as portable **Software Development Kit** (SDK) that can be integrated in any Service Provider software project (e.g. mobile app)

Schematic View: Commuters

Personal Travel Recommendations

5

1

2
(Data Supplier)

(Data Supplier)

Roads Co. **Bus Co.**
CommutEase
(Service Provider)

SDK

3

Data access event

4

Data Space Connector

EMDS

Personal Dataspace

Solid Pod Provider

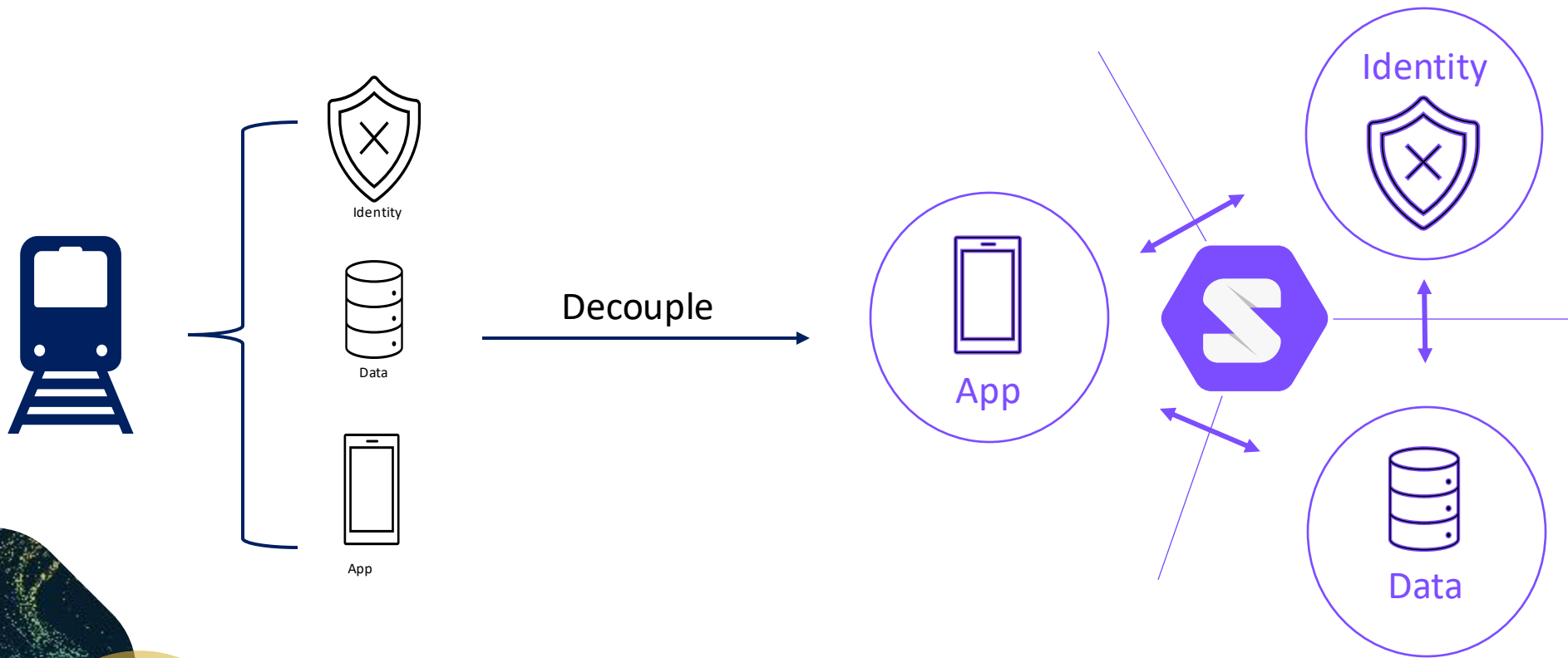|		
1 Personal data is generated by commuters, and might include: identity, public transport cards, home address, work/office location	**2** Mobility data is generated by mobility actors, and might include: public transport schedule, planned road or rail maintenance, event alerts	**3** For the provision of the recommendations, commuters **provide consent** for personal data to be **accessed** from their personal SOLID POD, via the SDK and by the Service Provider
4 Mobility data is sourced via the EMDS through the connectors that are made available.	**5** Service provider issues multimodal mobility commuting options without becoming the owner of the acquired data.	

Schematic View: PTA/PTO/TIM/IO

1 Personal data is generated by commuters, and might include: identity, public transport cards, home address, work/office address

2 Mobility data is generated by mobility actors, and might include: public transport schedule, planned road or rail maintenance, event alerts

3 To improve the service offering, commuters **provide** consent to **access** their anonymised personal data from the **SOLID POD**, via the SDK and by the mobility actors in the EMDS

4 Mobility actors analyse commuting patterns to enhance the schedule of public transport, or to open new bike lane, or charging points.

Role of SOLID and focus on the SDK

Considerations match with the Solid technology

Interoperability

Data protection

Data Sovereignty & Trust

Solid is a technology that organizes data, applications, and identities on the Web.

Data   App   Identity
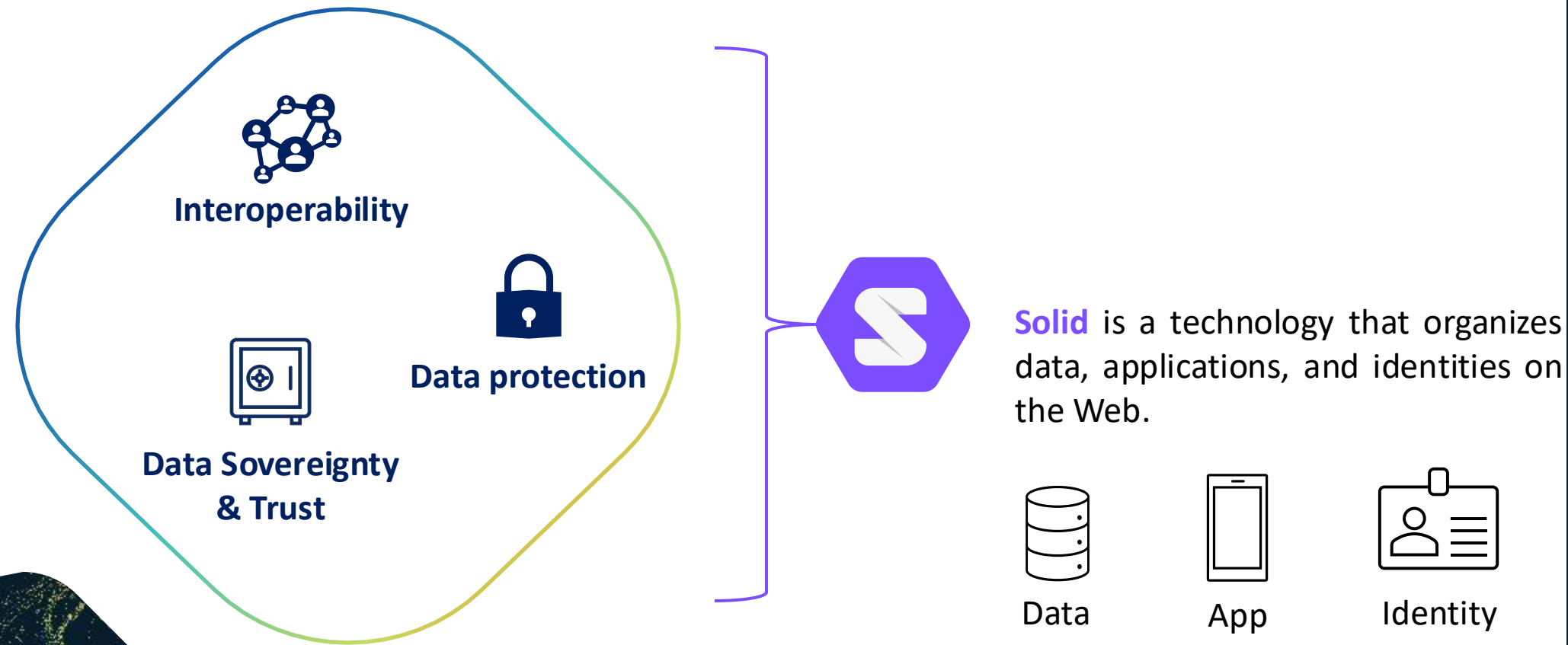
Solution

At the core of **Solid** is the idea of decoupling these three elements from each other and standardising the interactions between them.

PoC and its cornerstones in practice

Identity

Use.id*

Data

Use.id* pods

SDK

Third party application

App

Demo application
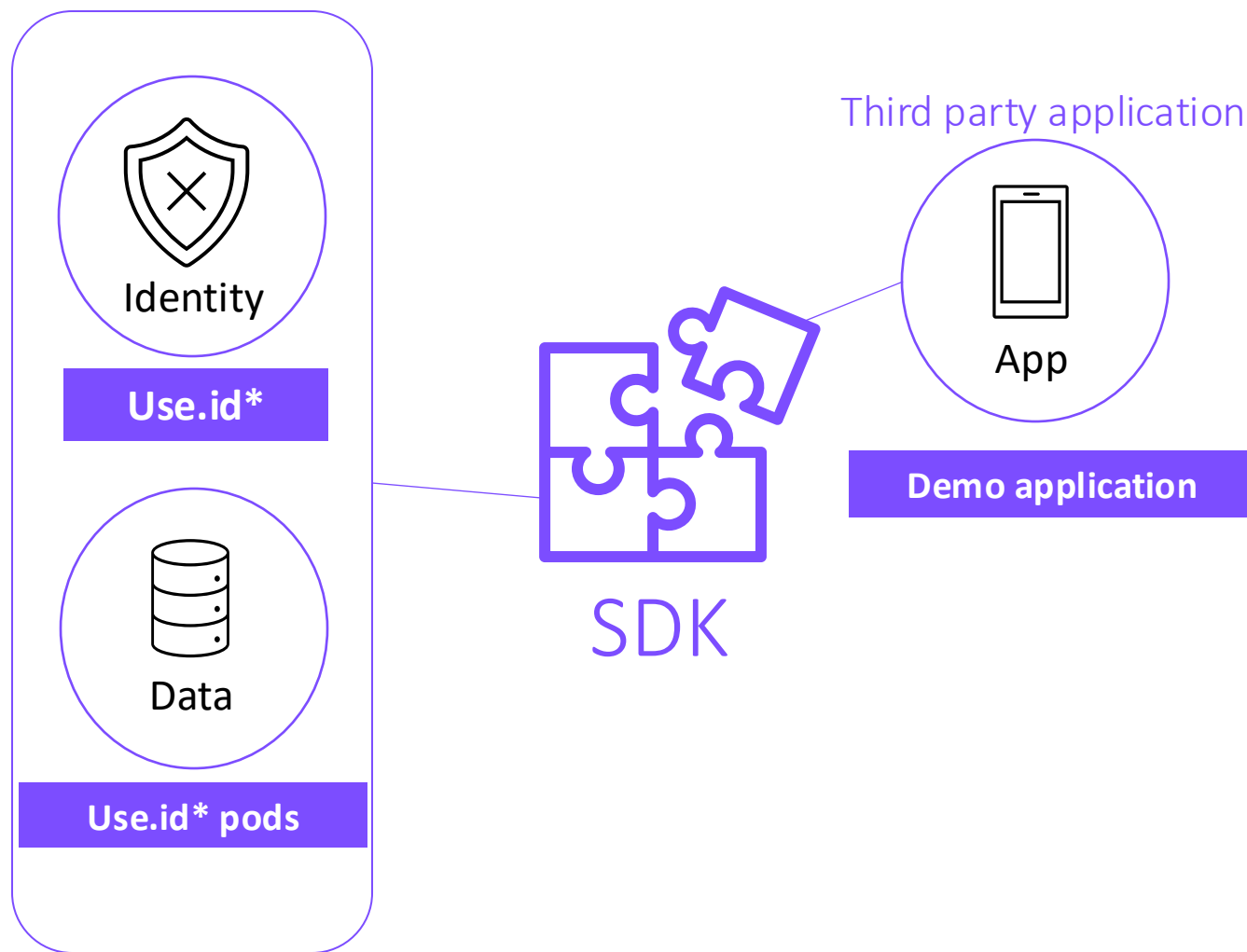
*Can be any other Solid pod or identity provider

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Software Development Kit

⟶ **Creation** of a SOLID Pod

⟶ **Verification** of **identity** and **authorisation** mechanism

⟶ **Storage** of **personal data**

⟶ **Linked Data base** representation of personal data facilitating interoperability across service providers and other actors

⟶ Management of **access** to personal data

⟶ Review of previously **granted consent** to personal data with fine-grain detail

⟶ **Access to personal data** for service providers

⟶ Detaches the **pre-existence of a SOLID** Pod from the provision of the mobility service

⟶ **Portable** to more Data Spaces

⟶ **Open-source** project available on **GitHub**

⟶ **Detailed documentation** on how to integrate it into software projects

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Application Scenario Demonstration

Scene 1: Commuters

Welcome to CommutEase

How would you like to give access to your information?

Sign In with POD
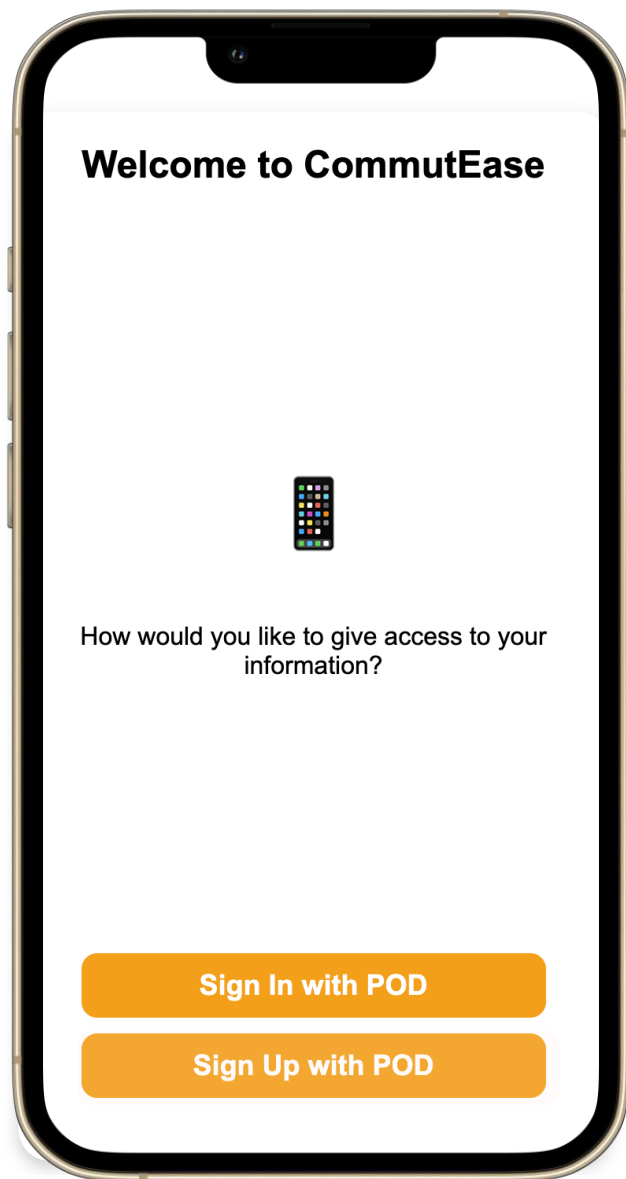
Sign Up with POD

CommutEase is a **mock-up app** that recommends the most efficient combination of modes of transport on a commute and for selected days during the week.

CommutEase welcome screen requires to **Sign In** or **Sign Up** with a POD.

We choose to **Sign Up** for the sake of demonstrating how easy it is to **create a POD for a new user**.

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Choose a POD Provider

USE.ID

myBank

myInsurance

BusCo

@myHome
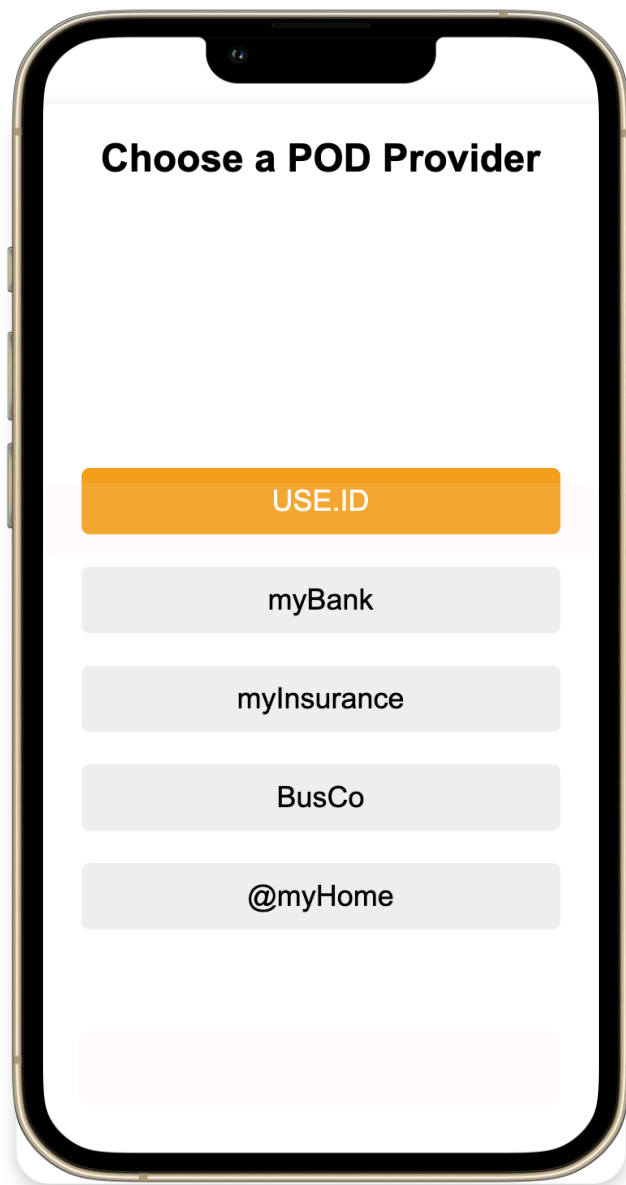
CommutEase shows a **list of POD providers** available to create a personal SOLID pod

Any entity can become a **service provider**.
SOLID allows also for a local installation of a POD at your home, for the ultra privacy-oriented user.

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Welcome to use.id

Enter your username and email address to sign up

Tom Heist

iamtom@useid.dev

Sign up

Creating a POD requires a username and email address.

You've got mail!

Next

Proceed with use.id to authenticate

use.id

To:

Wed 5/8/2024 7:02 AM

Hi,

To log in, please click on the link below.

https://idp.sandbox-use.id/otp/validate?
email=traincosolid%40outlook.com&otp=442302&web
id=https%3A%2F%2Fsandbox-use.id%2Ftraincosolid

If you did not request this email, please ignore it.

Kind regards

Reply   Forward
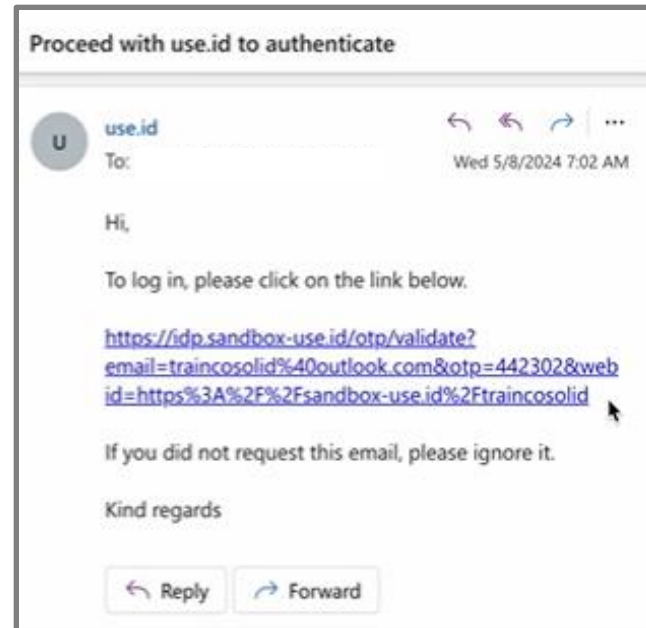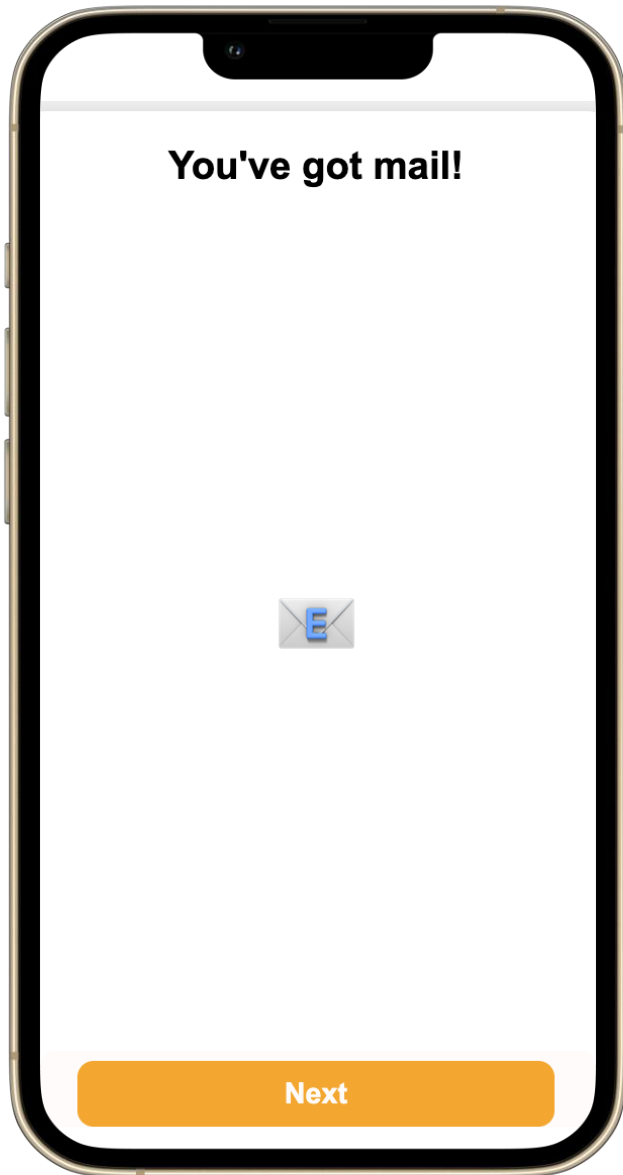
Agile creation of a SOLID POD

Verification of identity and authorization
SDK function call
const newToken = await exchangeCode();

A new screen presents the notification of an email message. This serves as acknowledgment that the POD has been created, and as **verification of identity** in case the POD already exists.

Users are directed to their email inbox, can click on a link that completes the identity verification, and leads back to the CommutEase app.

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Set Your Home Address

Rue de la Loi 175, 1040 Brussels

Next

Set Your Work Address

Avenue Louise 231, 1050 Brussels

Next
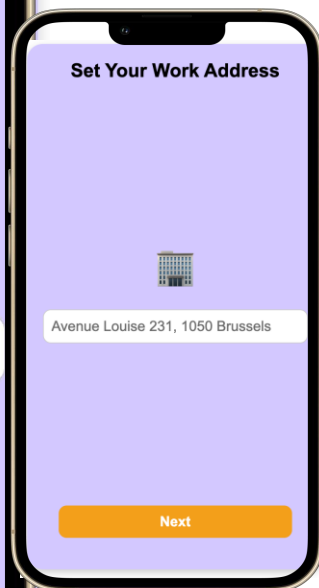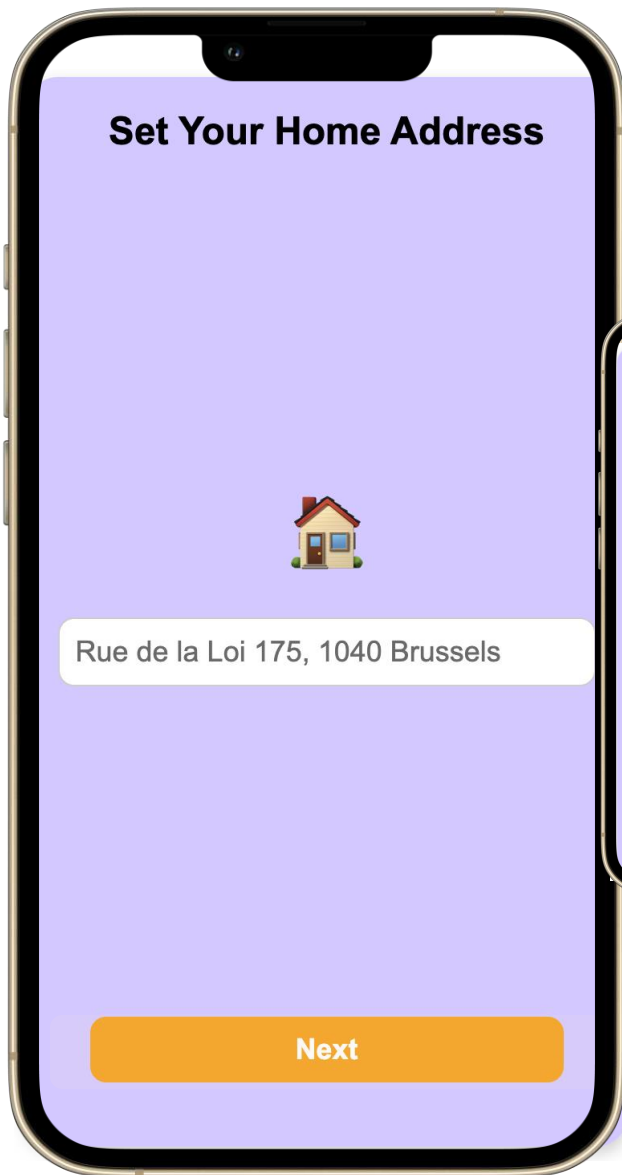
Storage of personal data
SDK function call:
createData()

Since our POD is newly created, CommutEase requests to fill in our POD with **personal data** necessary to for the commute recommendations to be issued.

Users are requested to specify their home and work address and confirm.

GDPR Articles 25 and 32 - Emphasize data protection by design and by default, as well as the implementation of appropriate technical and organizational measures to ensure data security

Select Your Modes of Transport

- 🚐 Bus *(on)*
- 🚆 Train *(off)*
- 🚴 Bike *(on)*
- 🛴 Scooter *(on)*
- 🚗 Car *(off)*
- 🚙 Electric Vehicle *(off)*

Next
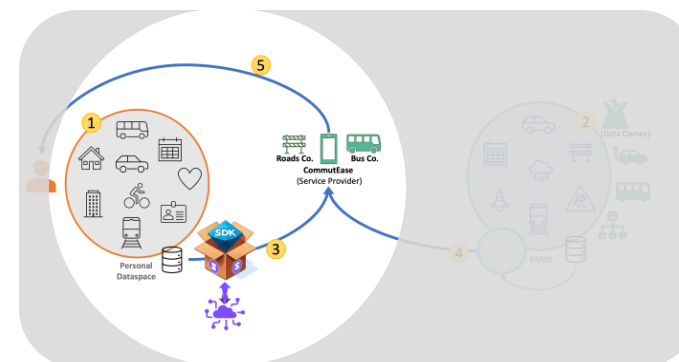
Storage of personal data
SDK function call:
createData()

Users are requested to specify their preferred **means of transportation** and confirm.

Options include bus, train, bike, scooter, and car.
Multiple selections allowed for flexibility in **commute options**.

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Select Your Travel Days

Mon   Tue   **Wed**   **Thu**   Fri

Next
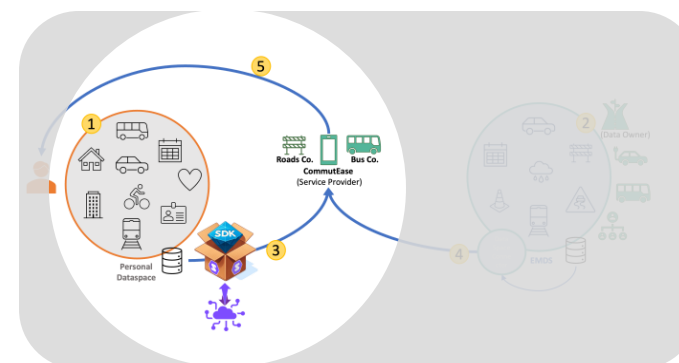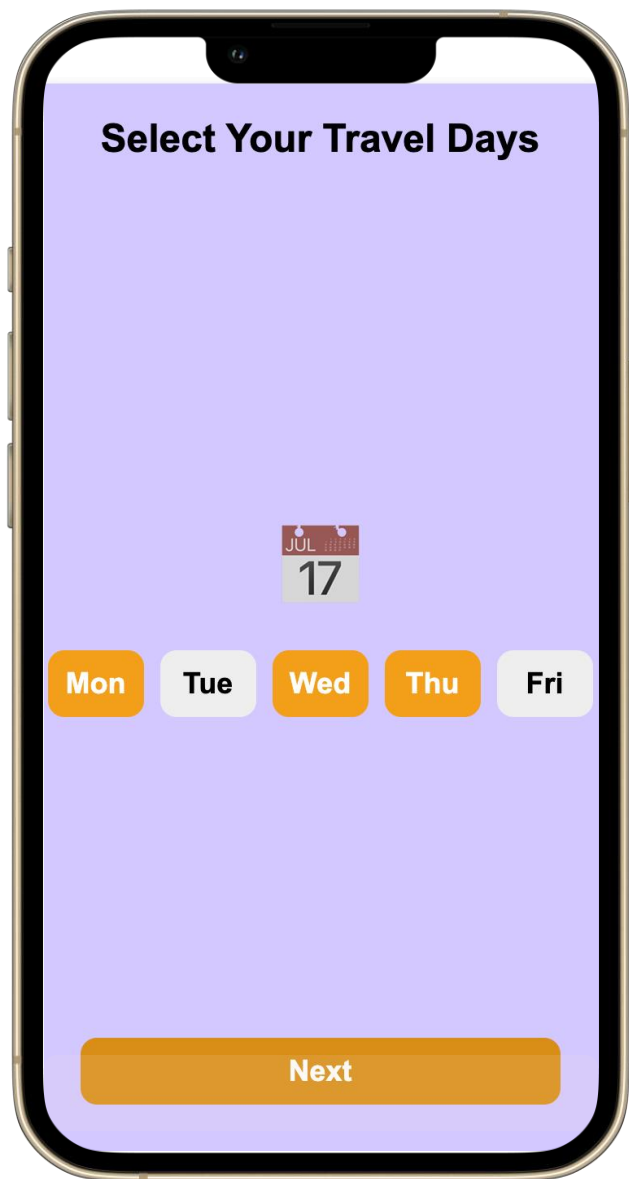
Storage of personal data
SDK function call:
createData()

Users are requested to specify **when they commute** during the week and confirm.

Manage Data Access

Select which personal data to share:

- 🏠 Home Address ⬤
- 🏢 Work Address ⬤
- 🚗 Modes of Transport ⬤
- 📅 Travel Dates ⬤
- 👤 Name ○
- ✉️ E-mail ○
- 🔢 Age ○
- ⚥ Gender ○

Confirm
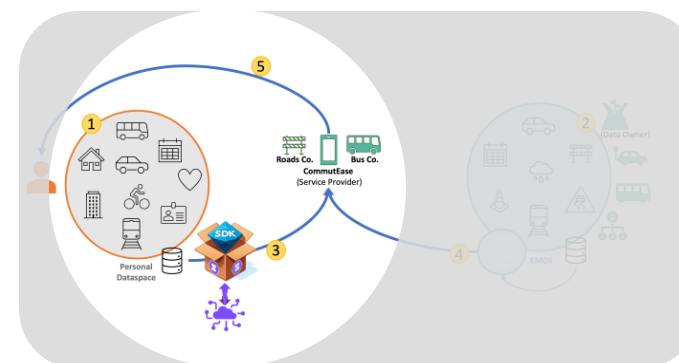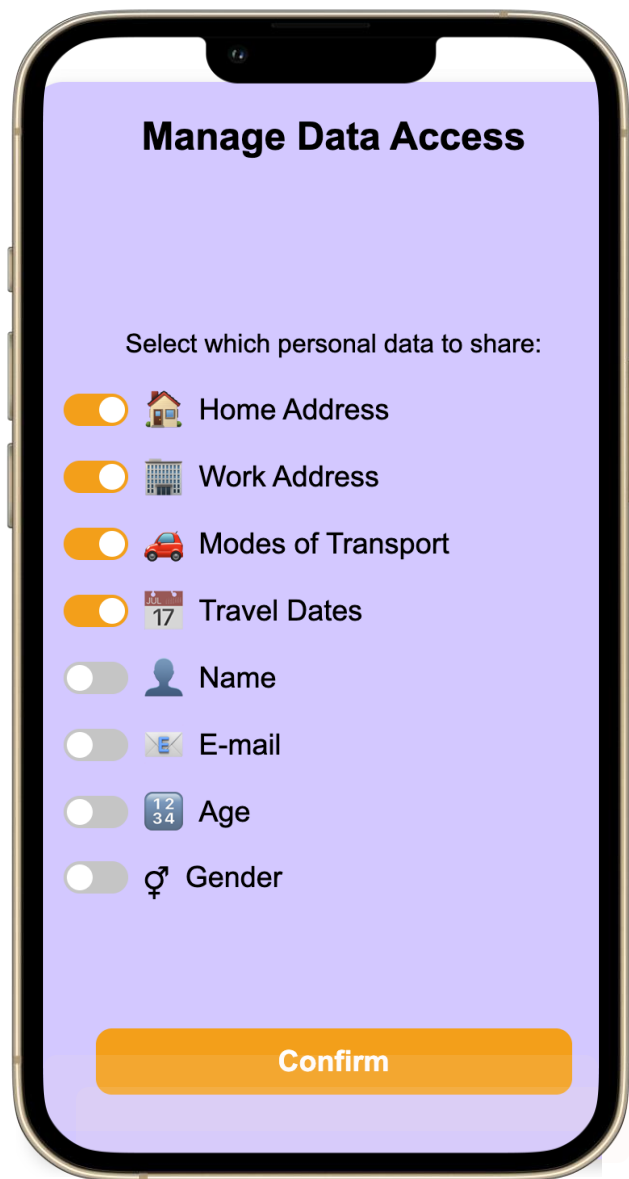
Review of previously granted consent to personal data with fine-grain detail
SDK function call:
requestPatch()

Users can **manage the access to personal data**, switching them on and off selectively.

Some data are mandatory to access or the CommutEase app won't be able to provide recommendations

GDPR Articles 25 and 32 - emphasize data protection by design and by default, as well as the implementation of appropriate technical and organizational measures to ensure data security

GDPR Article 15 - The data subject shall have the right to obtain from the controller confirmation as to whether or not personal data concerning him or her are being processed

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Give Your Consent

I agree to share my travel data with the following apps:

- CommutEase
- TravelSmart
- UrbanGuide

Submit
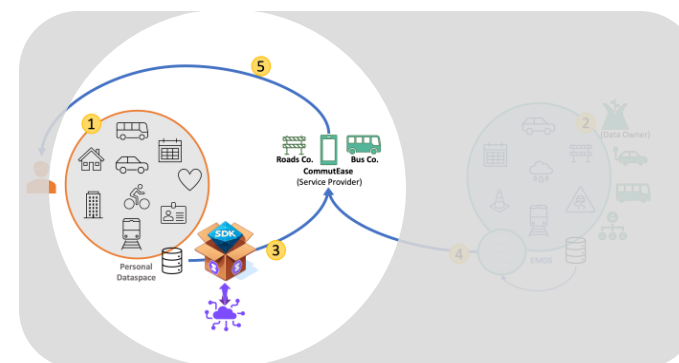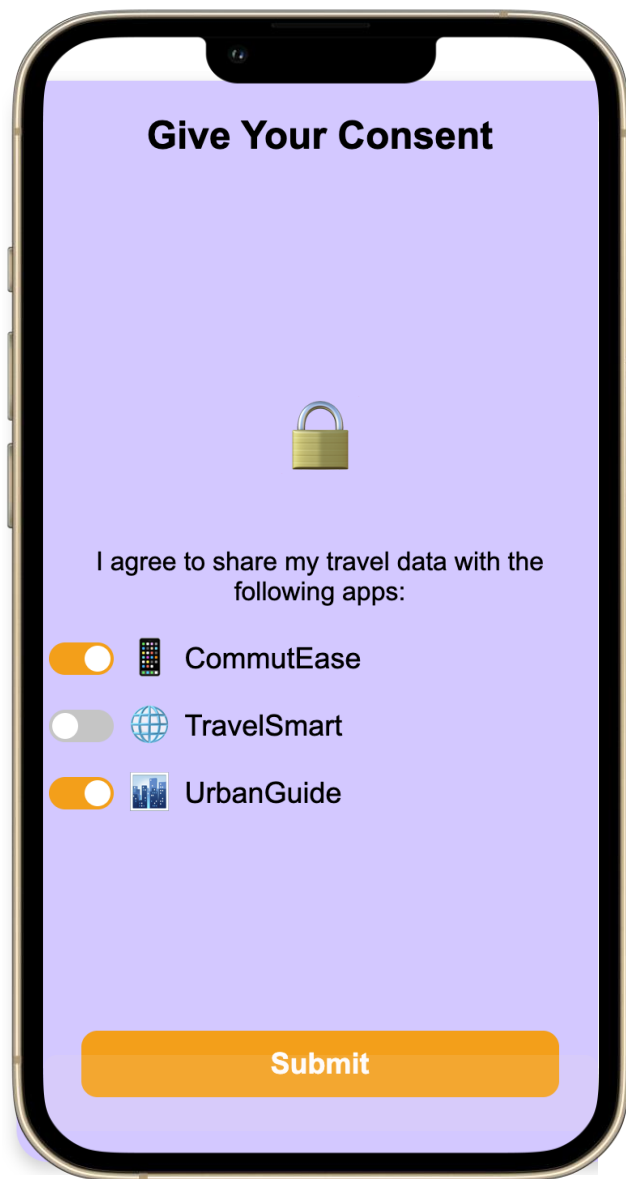
Users can manage consent globally to a service provider to access personal data, in the same way a commuter can revoke consent.

GDPR Article 7(3) - The data subject shall have the right to withdraw his or her consent at any time

Summary

Review your choices:

🏠 Home Address: Rue de la Loi 175, 1040 Brussels

🏢 Work Address: Avenue Louise 231, 1050 Brussels

🚗 Modes of Transport: Bus, Train

📅 Travel Days: Mon, Wed, Thu

Confirm
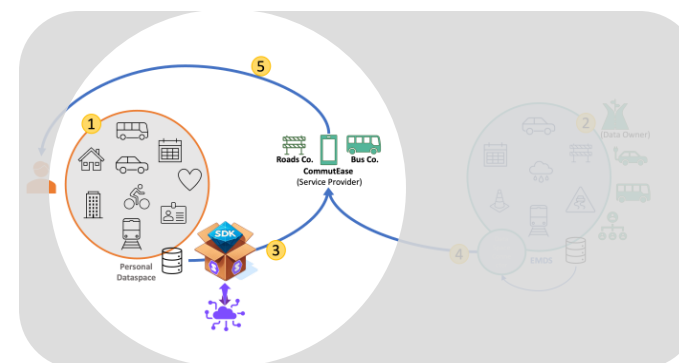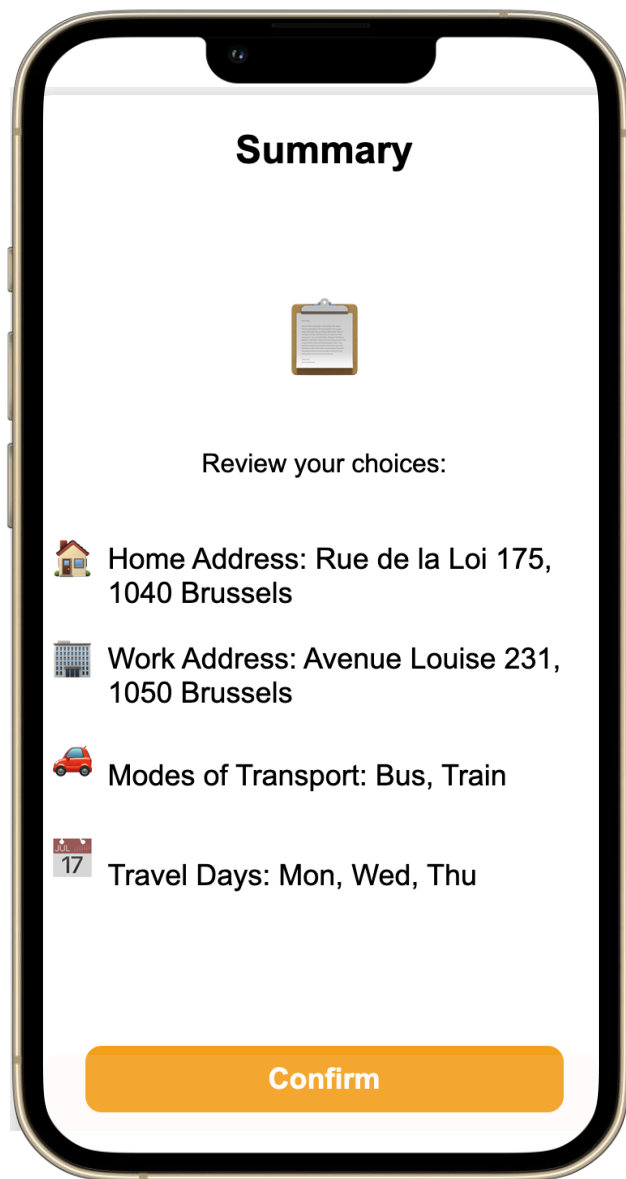
Finally, users are prompted a summary screen to review the personal data that is provided. By doing this, they are assured that there is no mistake.

Access to personal data for service providers.
Function Call:
getData()

GDPR Article 15 - *The data subject shall have the right to obtain from the controller confirmation as to whether or not personal data concerning him or her are being processed*
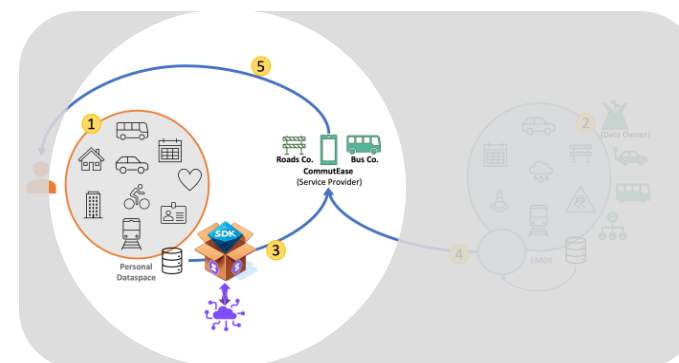
Application Scenario Demonstration

Scene 2: Transport Operator

Example of a transport operator
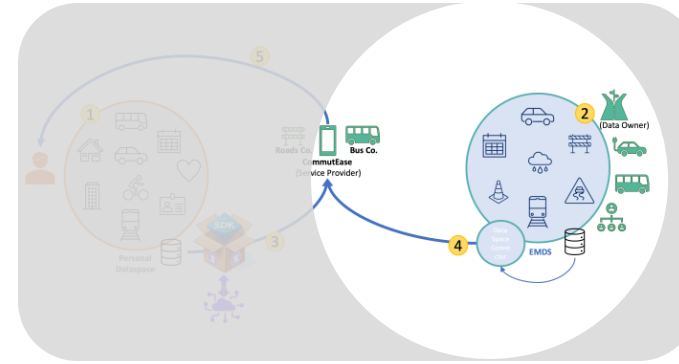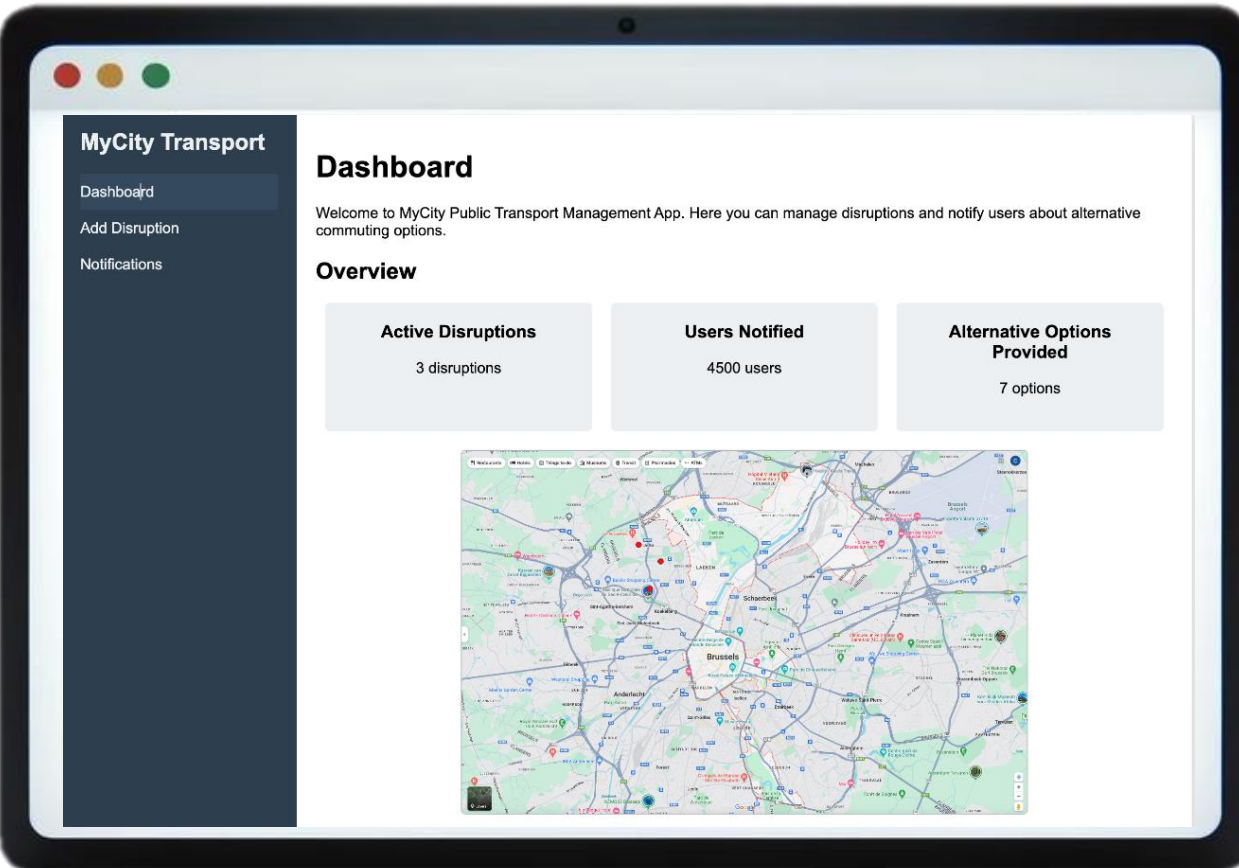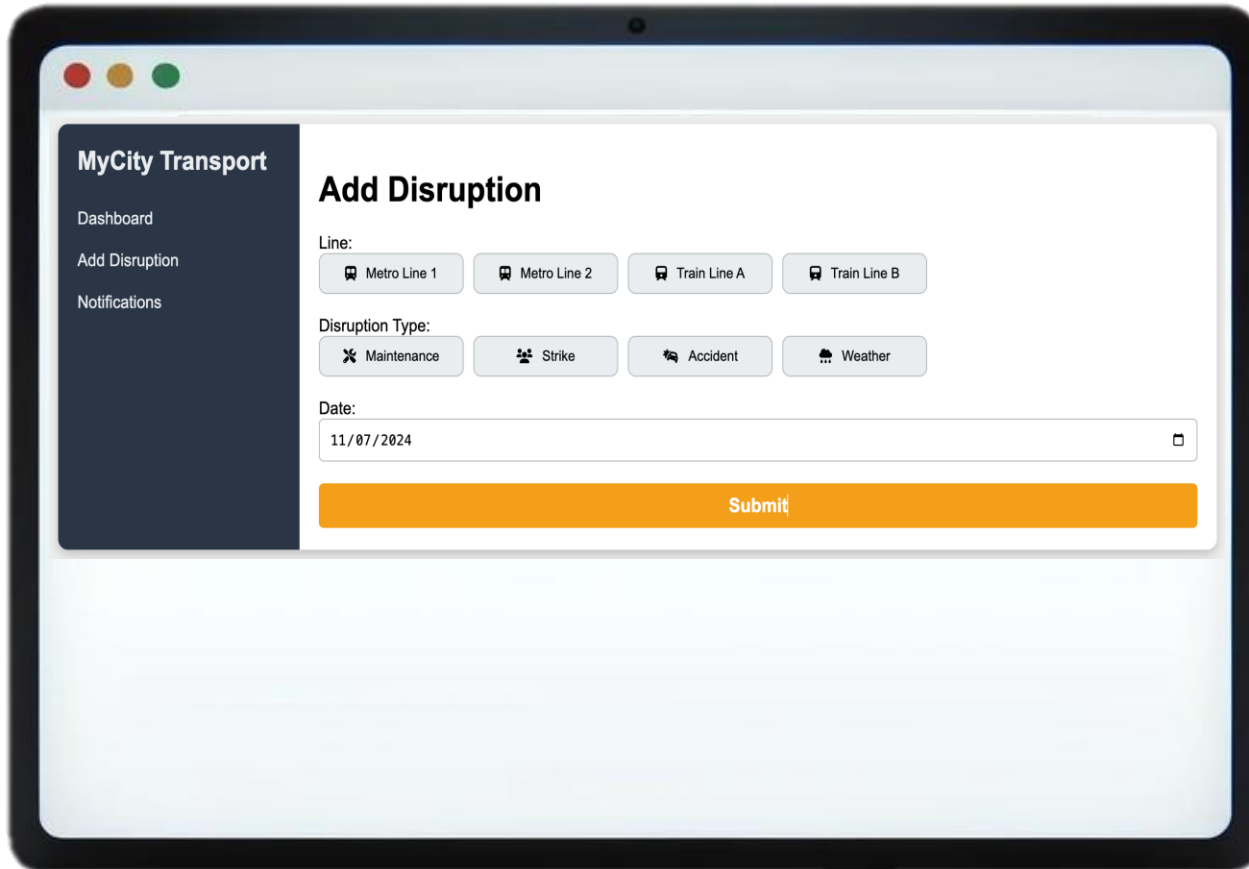
Transport Operators monitors the disruptions currently active.

The operators offer a service to log and notify users of potential future disruptions, allowing commuters to be better prepared

GDPR Article 5(1)(b) - *Personal data shall be collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes*
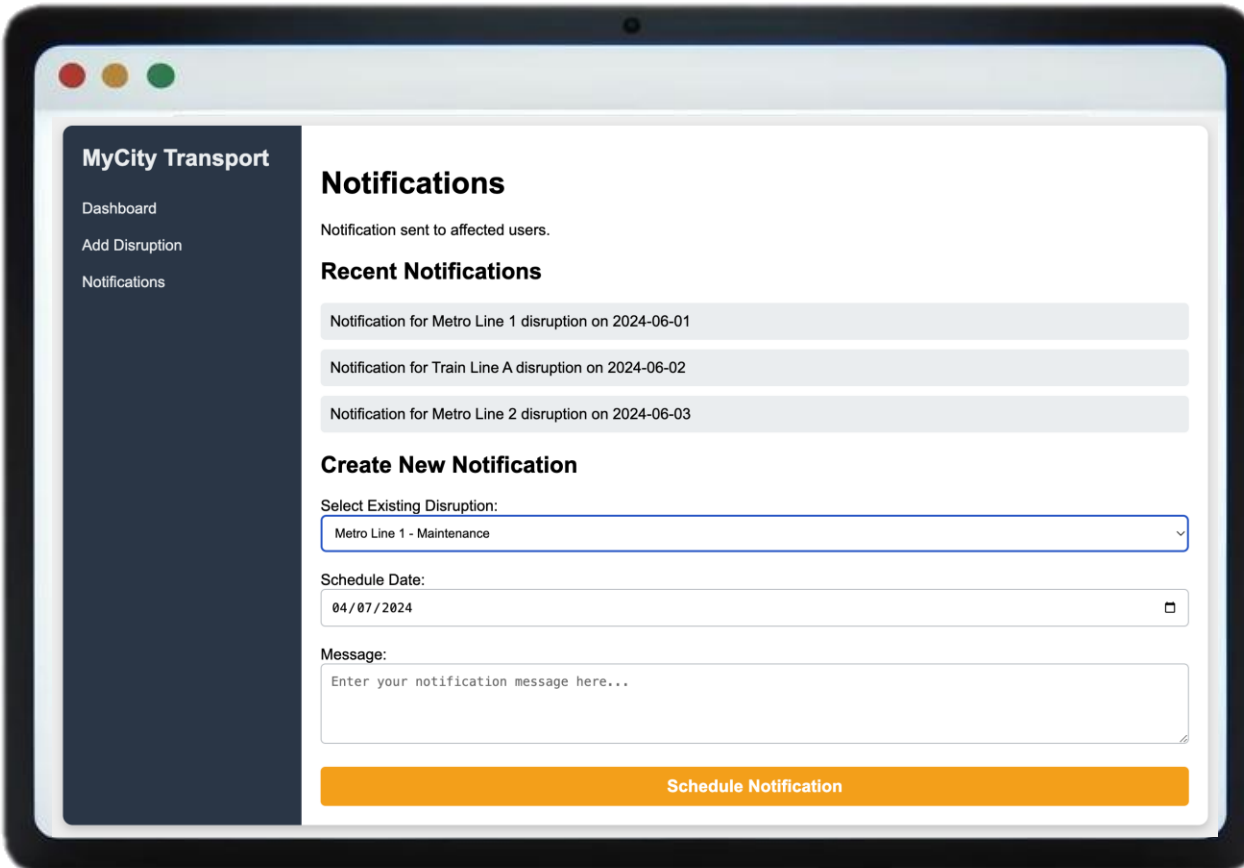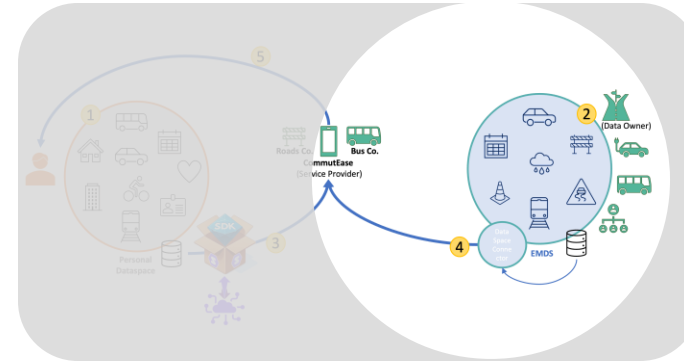
Example of a transcript operator
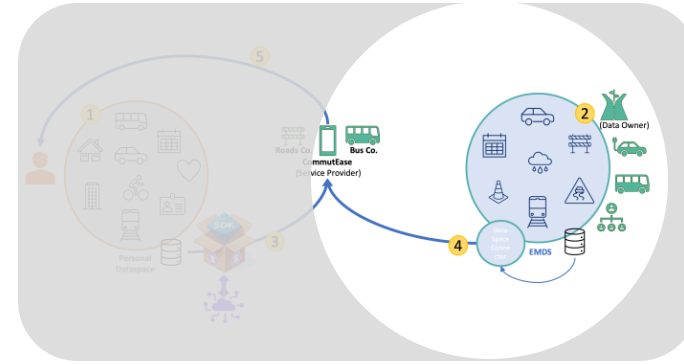
From their dashboard, operators create entries for planned disruption of the traffic.

Example of a transcript operator

The operators can schedule a message with a period of notification from the beginning of the disruption.

The notification message becomes part of the mobility data space dataset.

Recommendation for your commute

⚠️

Your usual commute for tomorrow is disrupted due to rail works.

🚌 Take Bus Route 12

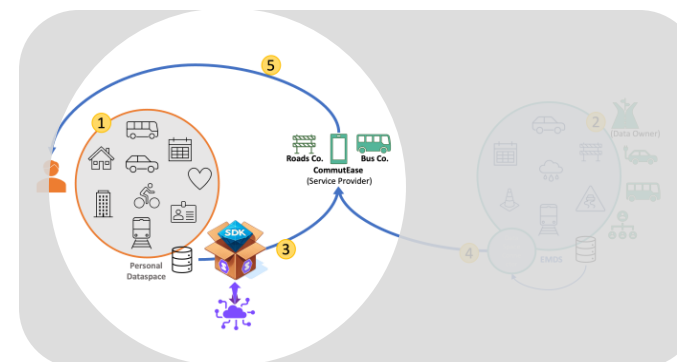🚴 Use temporary bike lane on 5th Avenue

🛴 Take a scooter from Station B

Ok

Users receive **personalised commute recommendations** based on selected transport modes and travel data.

Alerts for any disruptions and alternative routes provided.

Explore the SDK on GitHub

main ▾   ⑂ 1 Branch   ◌ 0 Tags   🔍 Go to file   <> Code ▾

About

No description, website, or topics provided.

👤 wouteraj   chore: version 0.17.0 ✓   d0af42a · last month   🕐 4 Commits

📖 Readme

📁 .changeset	chore: initial commit	3 months ago
📁 .github/workflows	chore: initial commit	3 months ago
📁 demo	chore: version 0.17.0	last month
📁 sdk	chore: version 0.17.0	last month
📄 .gitignore	chore: initial commit	3 months ago
📄 .npmrc	chore: initial commit	3 months ago
📄 .nvmrc	chore: initial commit	3 months ago
📄 README.md	chore: version 0.17.0	last month
📄 movejs.code-workspace	chore: initial commit	3 months ago
📄 package-lock.json	chore: version 0.17.0	last month
📄 package.json	chore: version 0.17.0	last month
📄 tsconfig.base.json	chore: initial commit	3 months ago
📄 turbo.json	chore: initial commit	3 months ago

〜 Activity

▤ Custom properties

☆ 0 stars

👁 6 watching

⑂ 0 forks

Report repository

📖 README

📖 README

🔗 Solid-SDK

This repository contains an SDK and demo of the Solid protocol. It's written

Getting started

Start by installing the SDK as a dependency of your project.

```
npm i @useid/movejs
```

As a first step, you need to authorize your user. This is done by following OIDC's Code Grant Flow. To do so, start by generating a uri by calling the `requestPatch` function and redirecting the user.

```
const onSignIn = async () => {

    log('Handling sign-in', email);

    const patch = patchForCommuter(
        import.meta.env.VITE_CLIENT_ID,
        import.meta.env.VITE_SUBJECT_WEBID,
    );

    const uri = await requestPatch(
        email,
        i.codeVerifier,
        import.meta.env.VITE_IDP_BASE_URI, // idpBaseUri
        import.meta.env.VITE_CLIENT_ID, // clientId
        window.location.href, // redirectUri
        patch
    );

    window.location.href = uri;
```

31

Future Outlook

- Looking for **local authorities** that want to be involved in a **pilot** to test the use of the SDK in a real scenario of mobility.

- Connecting with **providers of technologies** to handle personal data and tackle data sovereignty.

- Review the Proof of Concept with the **Data Spaces Support Centre**

Thank you

Q&A

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https://joinup.ec.europa.eu/collection/interoperable-europe/interoperable-europe