



SMART MATCHING TOOL

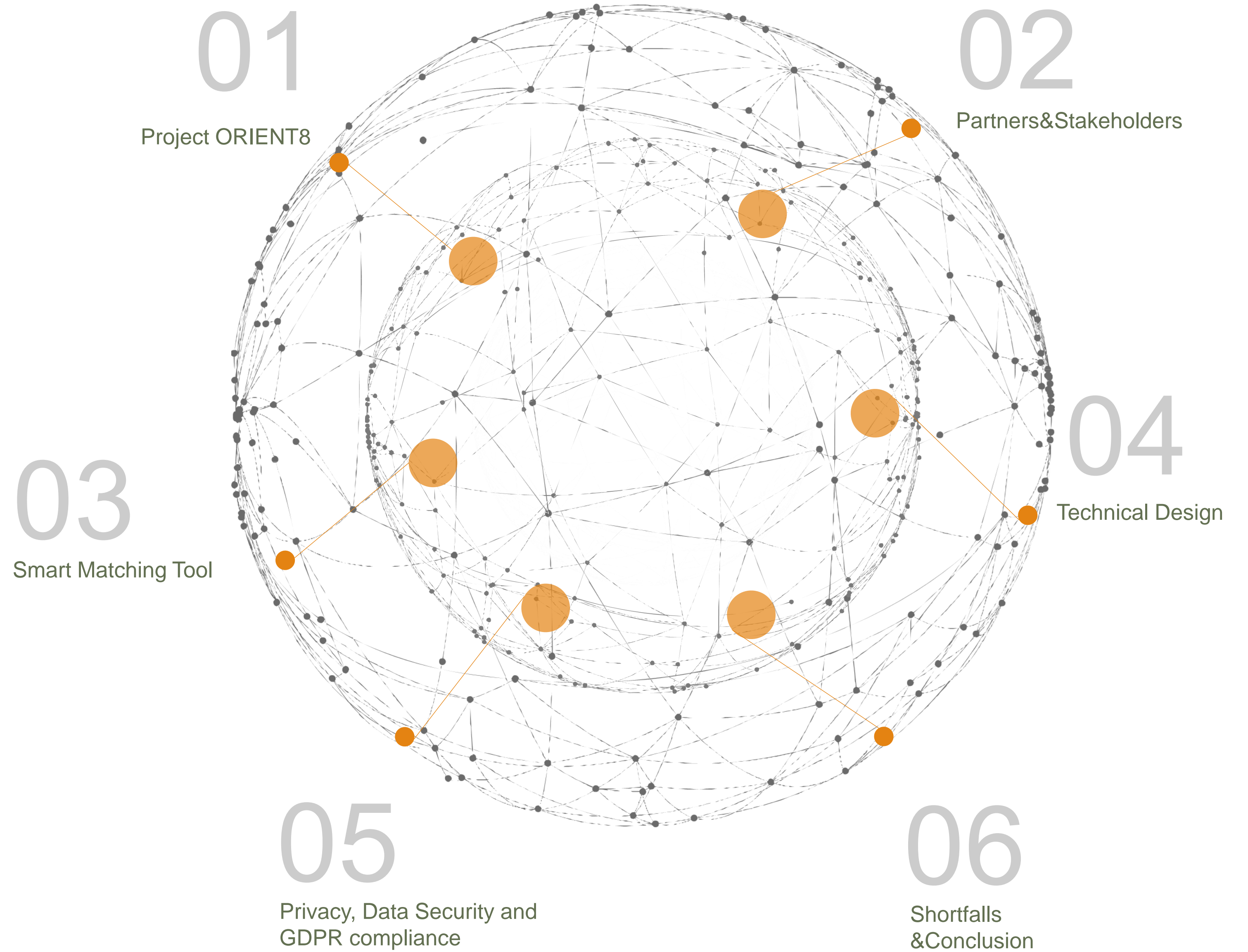
Design and Implementation

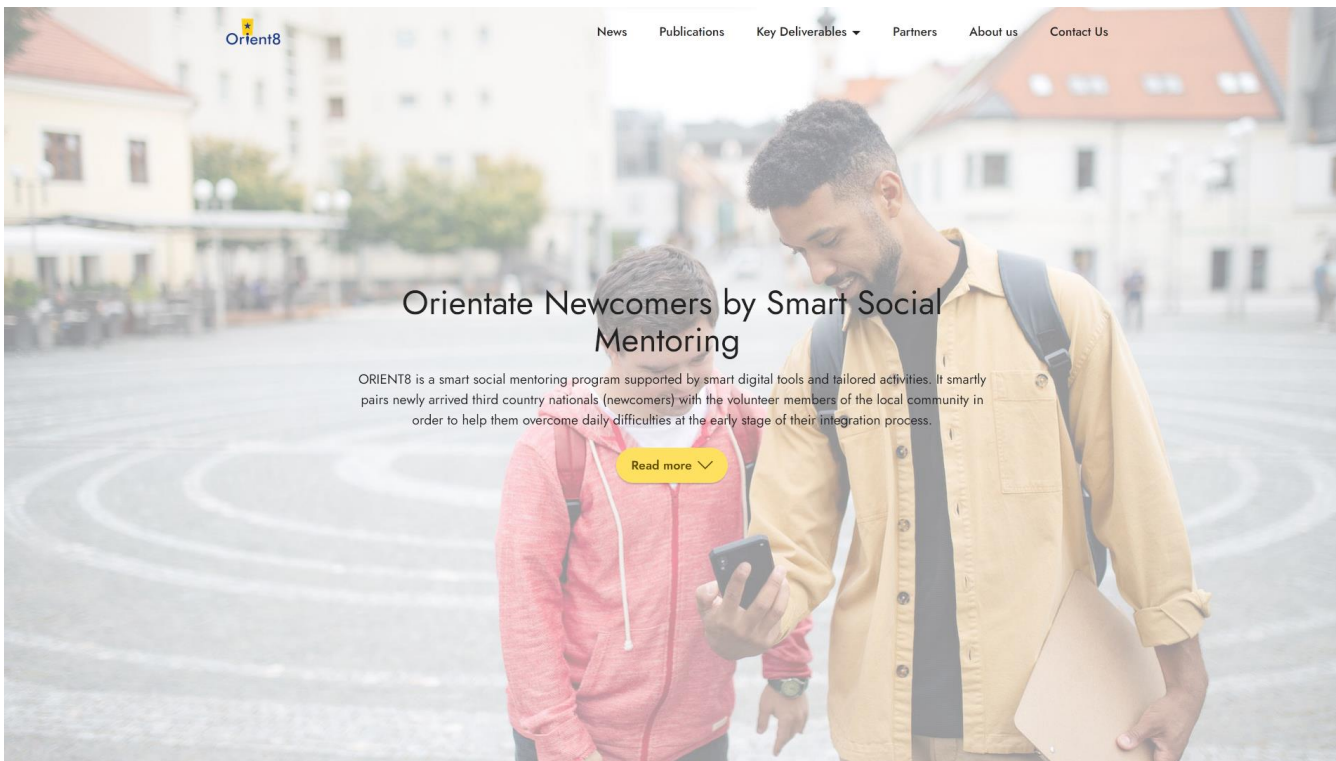


Project ORIENT8 has received funding from the European Union's Asylum Migration and Integration Fund (AMIF) under grant agreement No: 957978.

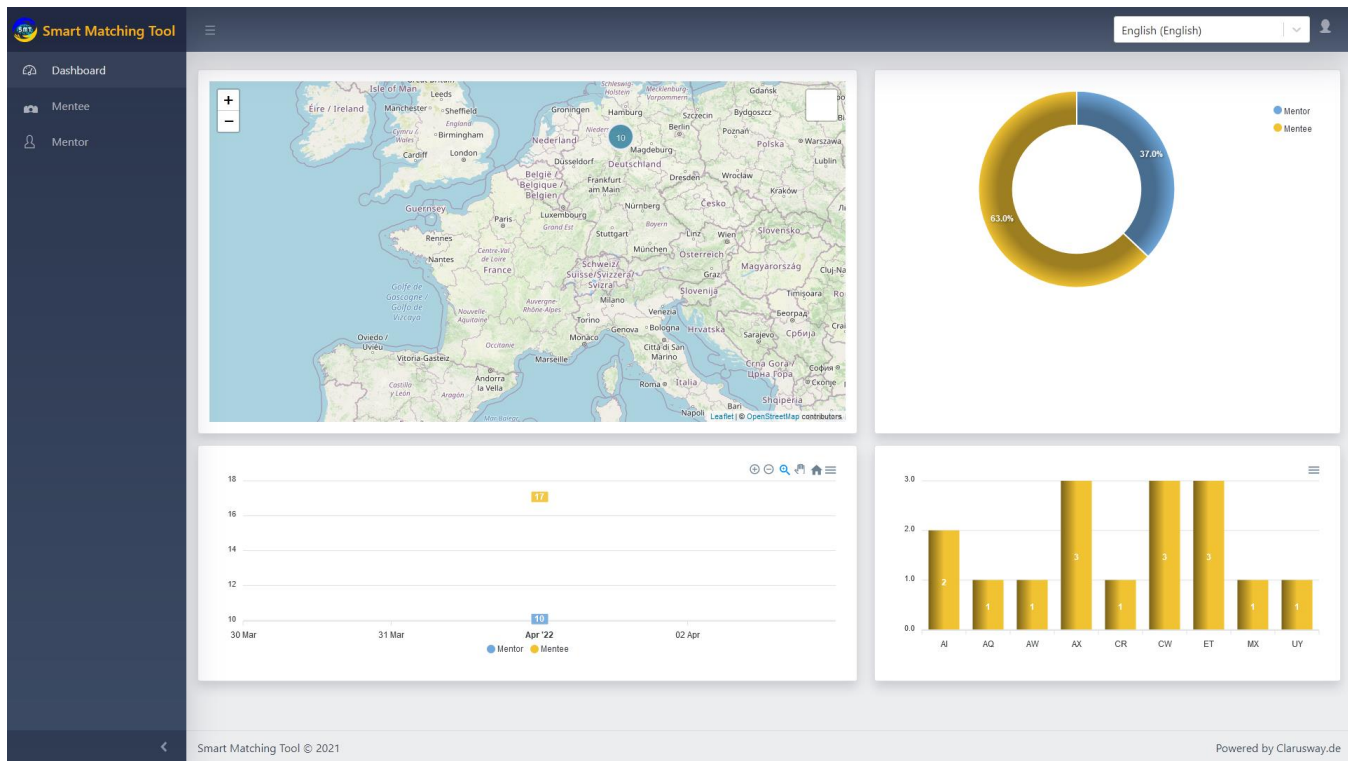


Presentation agenda

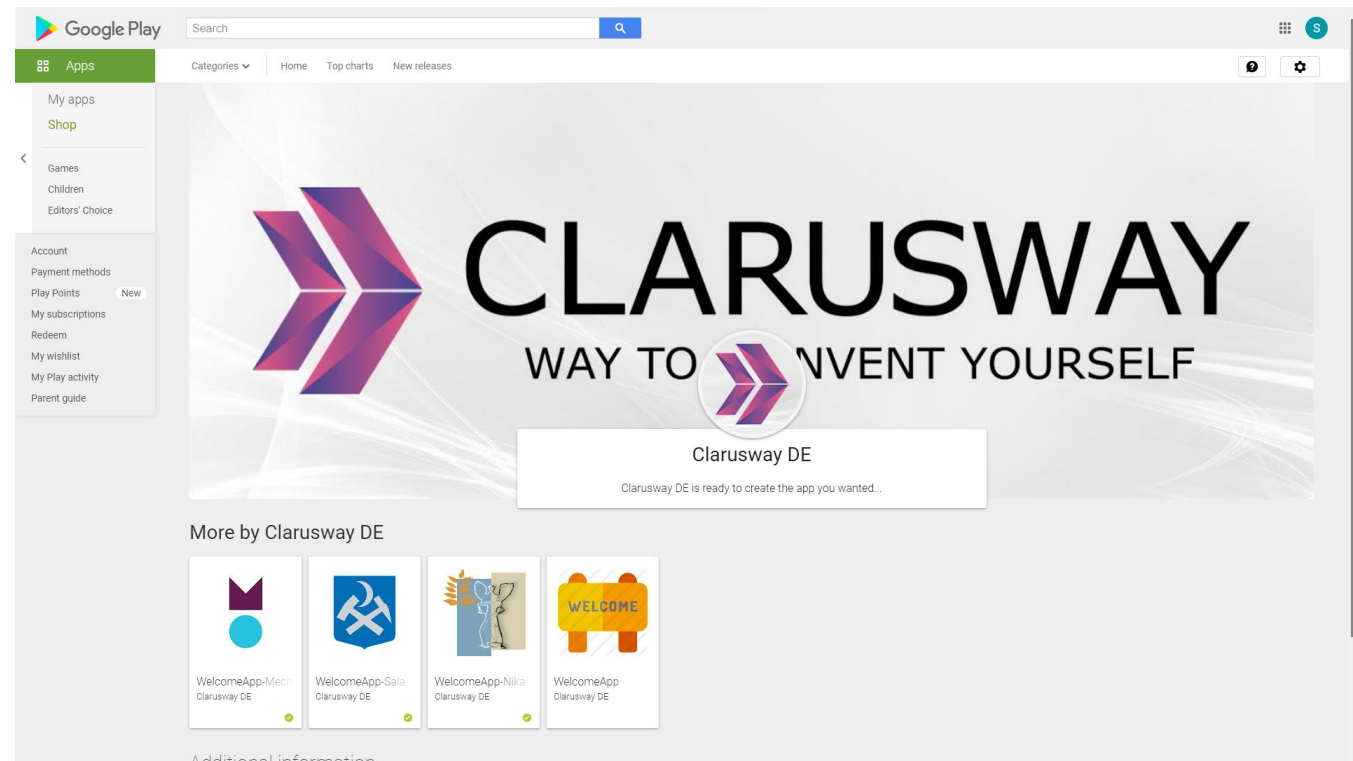




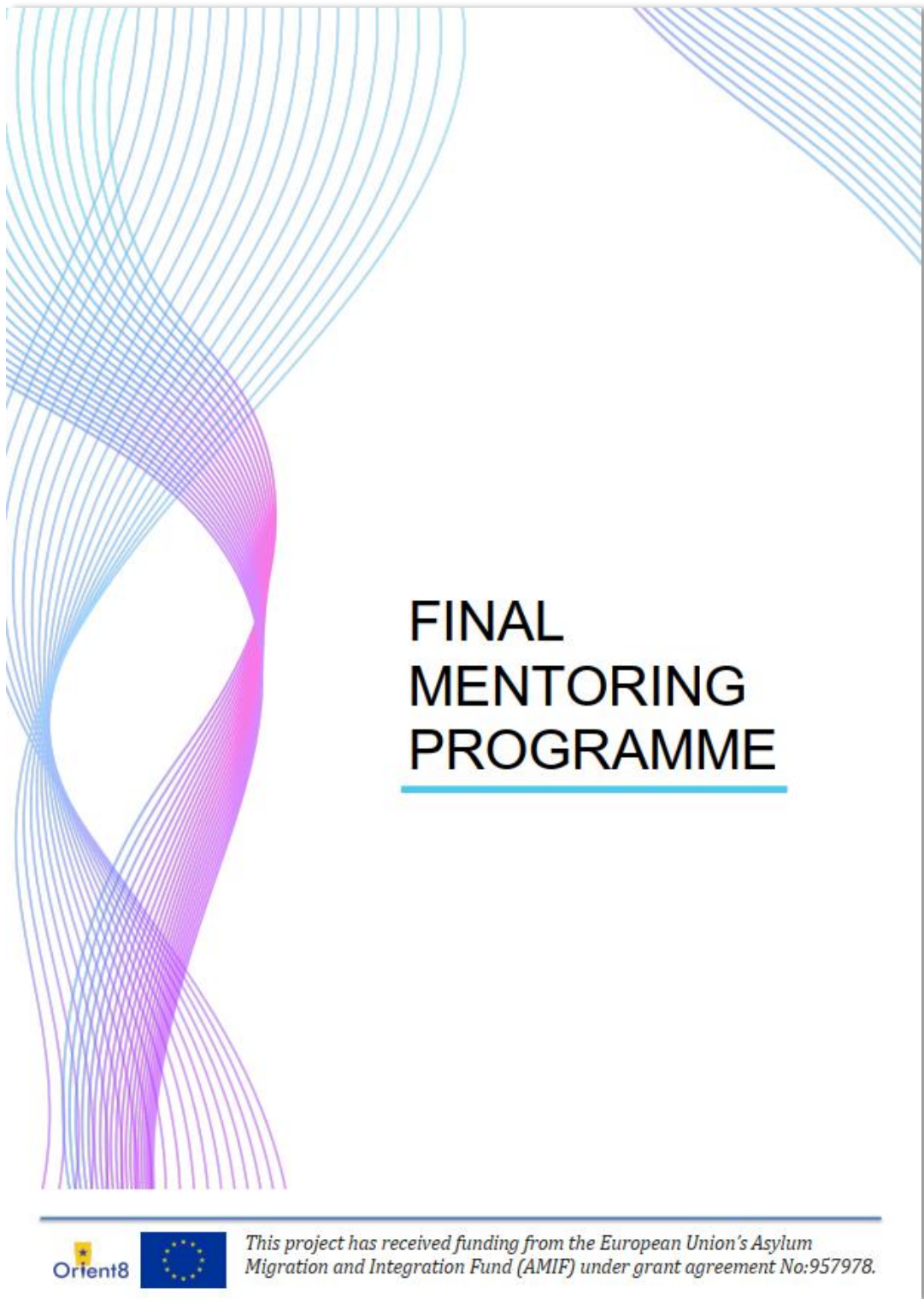
<https://orient8.eu>



Smart Matching Tool



Welcome Application

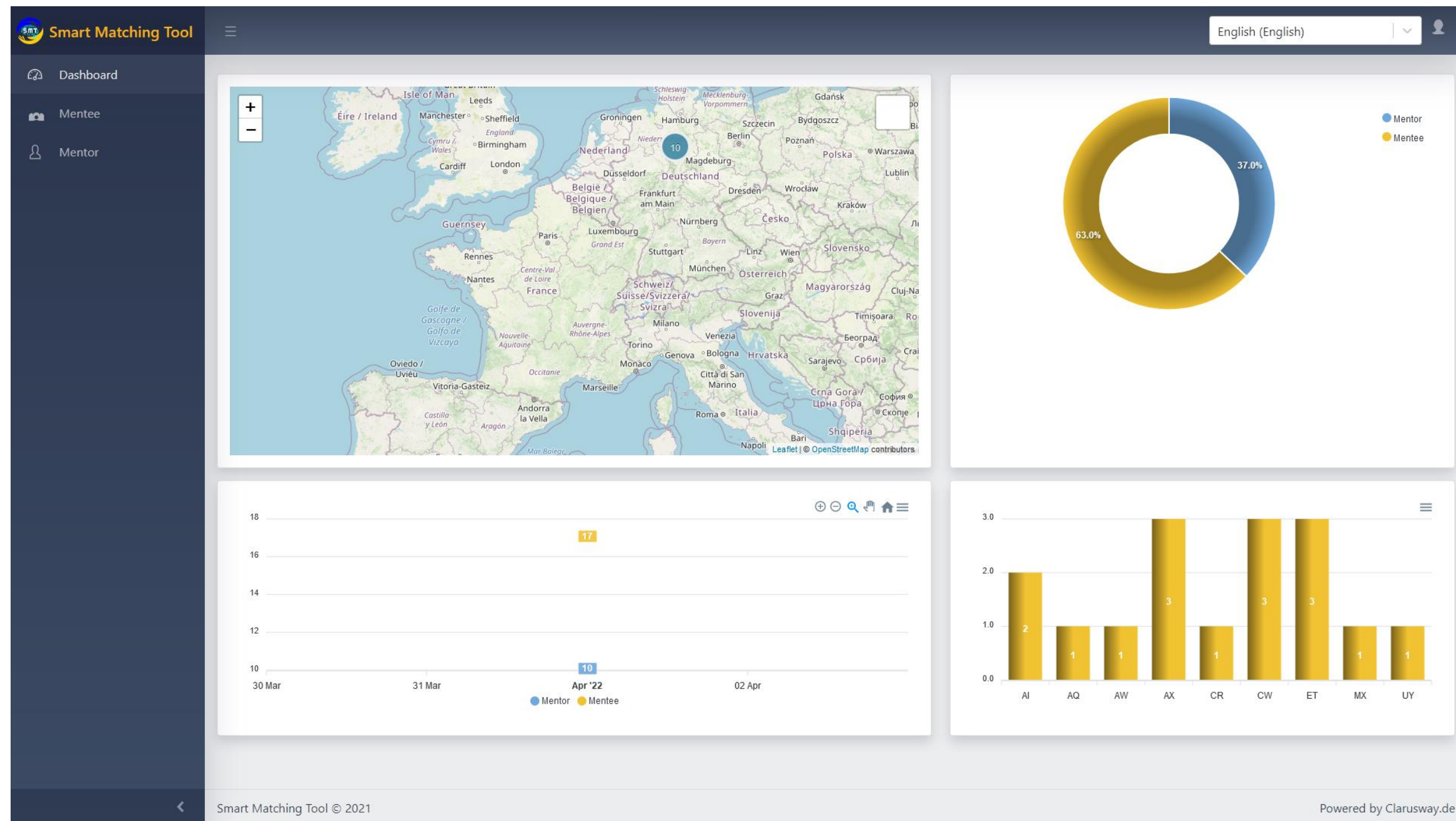


What is ORIENT8?

- It is a social mentoring program supported by smart digital tools and tailored activities.
- It pairs newly arrived third country nationals with the volunteer members of the local community in order to help them overcome daily life difficulties at the early stages of their integration process.
- **Primary target group:** Newcomers,
- **Secondary target group:** Members of the host society,
- **Tertiary target group:** Practitioners.

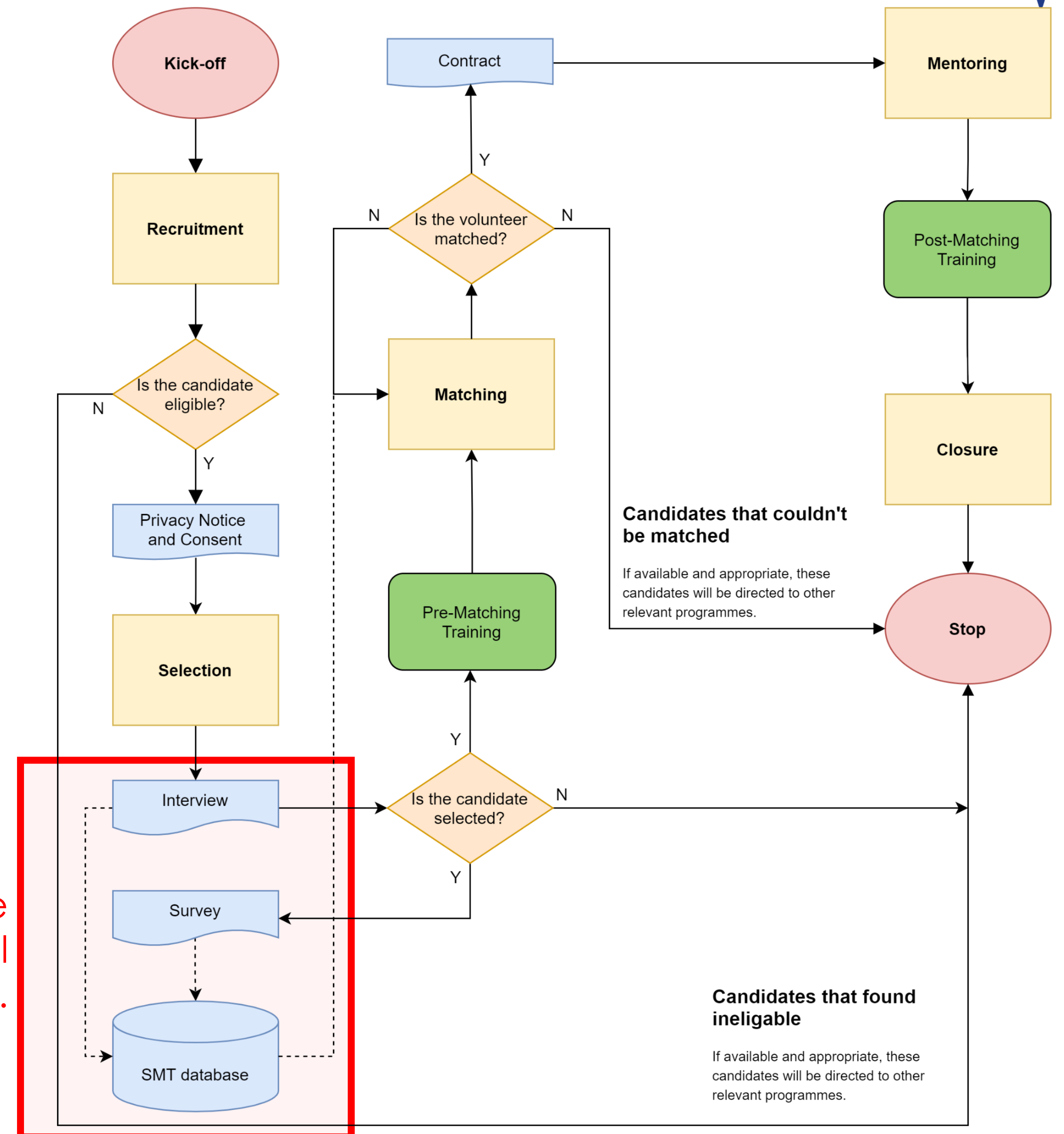


Main output of the action is an “effective, efficient and durable” **smart social mentoring program**.



And here is where smart matching tool comes into play.

ORIENT8 Social Mentoring Programme Workflow





Project Implementation Chart

ORIENT8 lasts 24 months.
We are in the 17th month of implementation.



01 Project Management

02 Mentoring Program Guidelines
and Evaluation

03 Mentoring Program
Development

04 Mentoring Program
Implementation

05 Dissemination

06 Ethics Requirements



Partners and Stakeholders

Project Coordinator

- BtH ISSG - Belgium

Research Partner

- KU Leuven HIVA - Belgium

Implementation

- Stad Mechelen - Belgium
- Municipality of Nikaia – Rentis - Greece
- Sala Kommun - Sweden

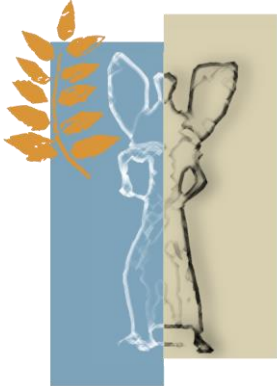
IT Solutions

- Clarusway DE - Germany

Belgium



Greece



ΔΗΜΟΣ
NIKAIAS • ΑΓ. Ι. ΠΕΝΤΗ

Sweden



Germany

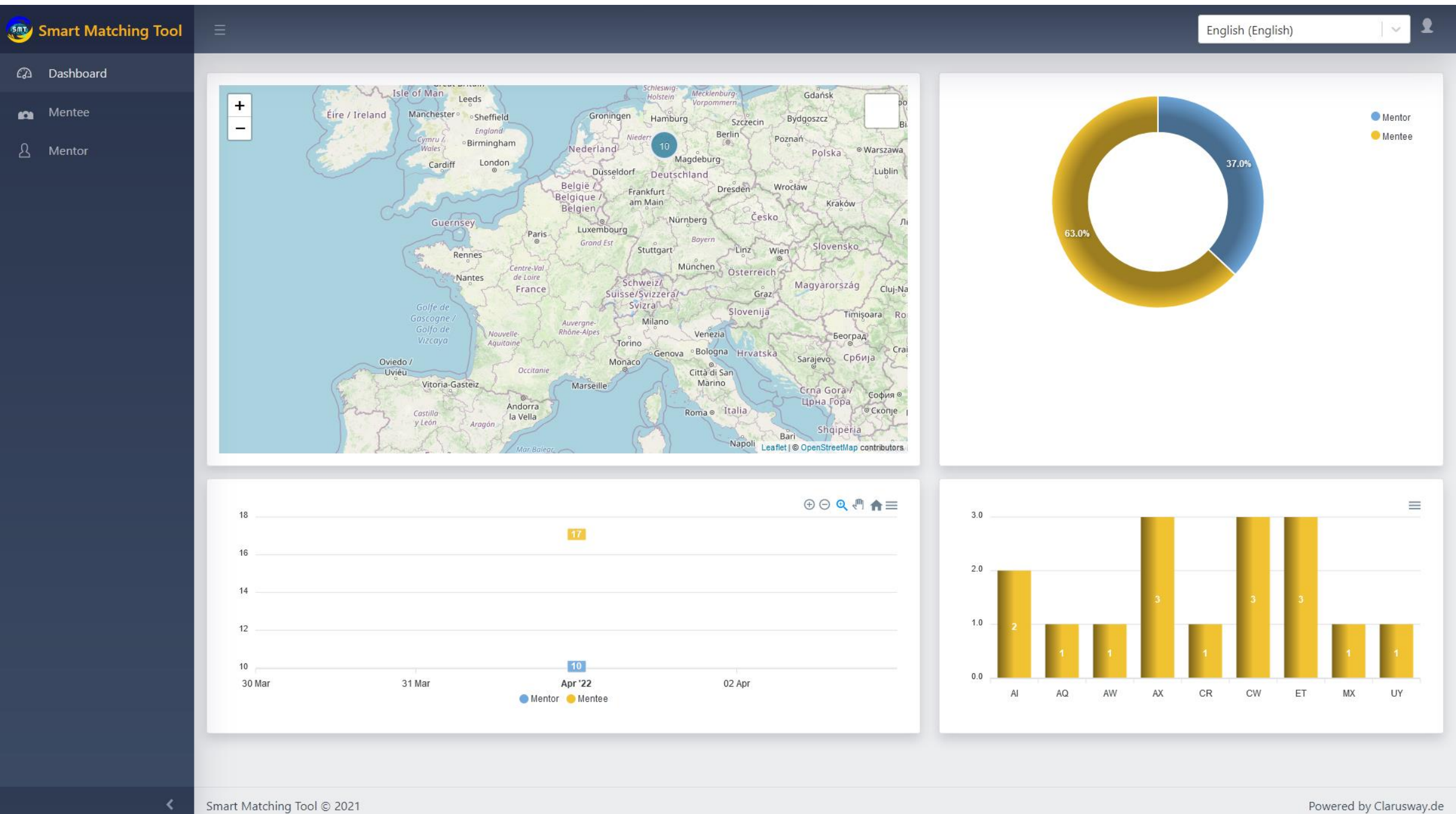




Smart Matching Tool in a Nutshell

- Smart Matching Tool is a **Machine Learning** application aimed to match mentees and mentors using the criteria developed particularly for social mentoring by HIVA.
- A **questionnaire** and a **survey** were developed and embedded into the application in order to retrieve data from data subjects.
- SMT focuses on **similarities**.
- **Three layers of matching** are used;
 - ❖ AI layer,
 - ❖ rule engine layer,
 - ❖ manual matching layer (human in the loop design).
- **Multilingual support** is available through machine translation (in case you don't use a translator).
- SMT complies with the **GDPR**.
- A **user manual** is available.

Category	Question		Rating	
Search 53 records...	Search 53 records...			
Hobbies & Interests	History	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Politics	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Economy	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Poetry reading	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Geography	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Foreign languages	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Medicine	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Law	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Cars	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Art	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Religion	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Outdoor activities	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Dancing	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Playing musical instruments	Not interested	☆☆☆☆☆	Very interested
Hobbies & Interests	Poetry writing	Not interested	☆☆☆☆☆	Very interested





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53 questions are asked to detect preferences

Smart Matching Tool

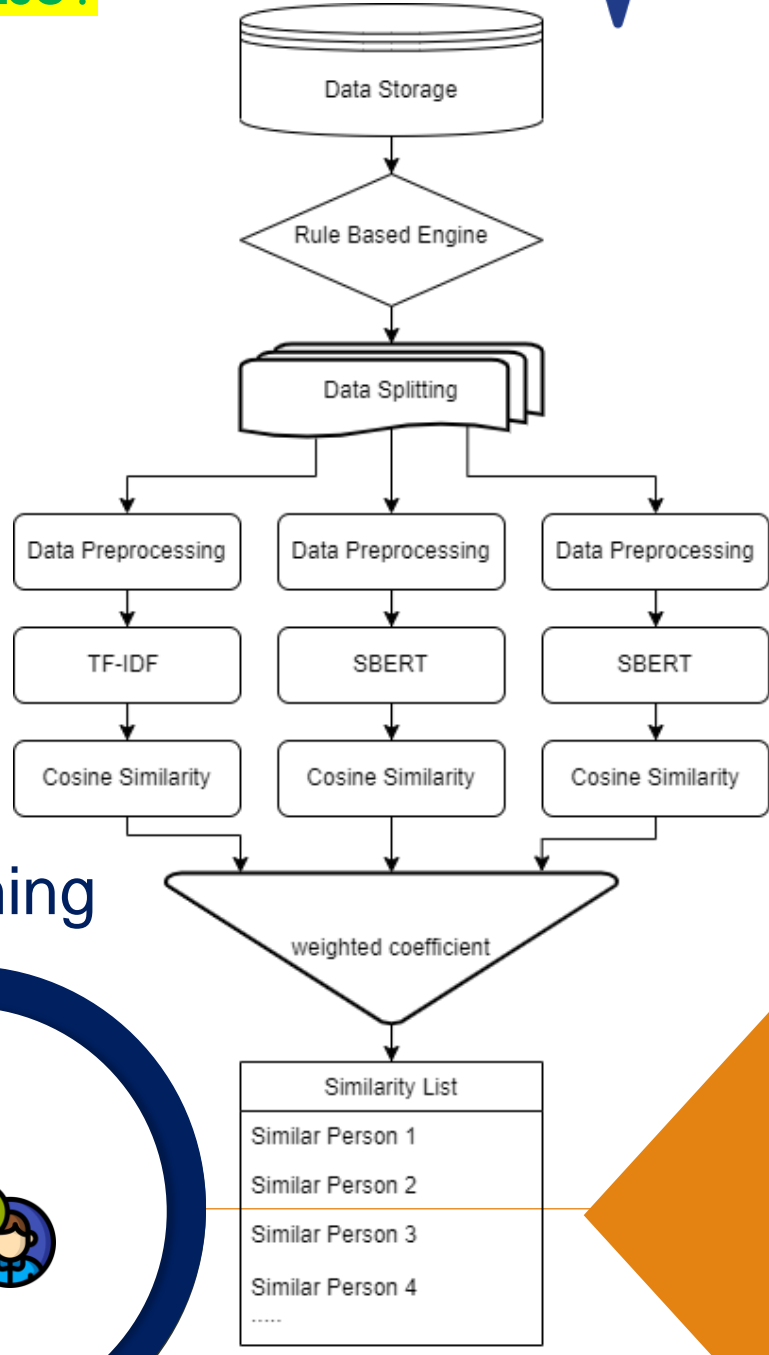
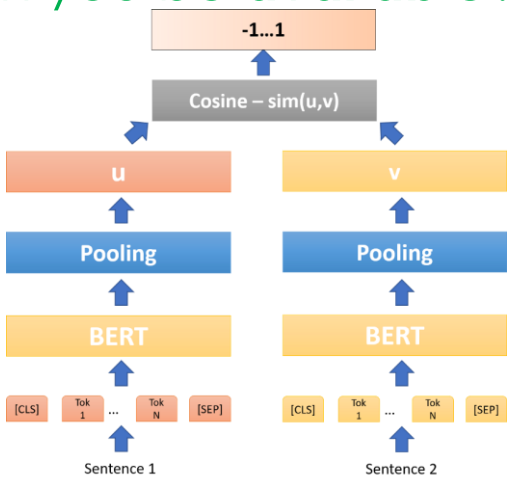
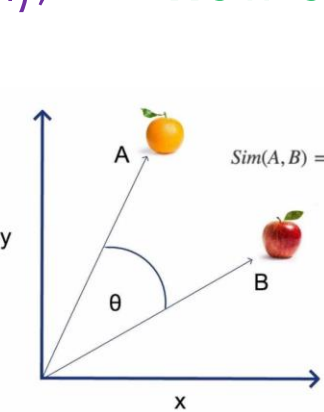
Data Processing Phases

Data Preprocessing

Rule Engine/Filtering

AI Tool

Matching



Name

Surname

Email Address

Marital Status

Phone Number

Birth Year

Gender

Motherland

Do you have children

What is your profession?

Areas of study

I prefer...

Which languages can you speak? (together with proficiency level)

In which areas you need to receive support most?

What are your expectations from the project?

What are your objectives in participating this project?

What are your areas of interest/expertise?

Remarks

Monday

09:00

12:00

14:00

18:00

19:00

21:00

Tuesday

09:00

12:00

14:00

18:00

19:00

21:00

Wednesday

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Saturday

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12:00

14:00

18:00

19:00

21:00

Sunday

09:00

12:00

14:00

18:00

19:00

21:00

Available periods

dd / mm / yyyy

dd / mm / yyyy

How often can you be available?

Neighbourhood_Postcode_Street

Neighbourhood_Postcode_Street

5	<i>The two sentences are completely equivalent, as they mean the same thing.</i>
	The bird is bathing in the sink. Birdie is washing itself in the water basin.
4	<i>The two sentences are mostly equivalent, but some unimportant details differ.</i>
	Two boys on a couch are playing video games. Two boys are playing a video game.
3	<i>The two sentences are roughly equivalent, but some important information differs/missing.</i>
	John said he is considered a witness but not a suspect. “He is not a suspect anymore.” John said.
2	<i>The two sentences are not equivalent, but share some details.</i>
	They flew out of the nest in groups. They flew into the nest together.
1	<i>The two sentences are not equivalent, but are on the same topic.</i>
	The woman is playing the violin. The young lady enjoys listening to the guitar.
0	<i>The two sentences are completely dissimilar.</i>
	The black dog is running through the snow. A race car driver is driving his car through the mud.

Smart Matching

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Neighbourhood_Postcode_Street

Add note

Mentee

In which areas you need to receive support most?

Housing

Education&Training

Employment

Health

Mentor

In which areas would you like to help us?

Housing

Education&Training

Employment

Health

1

Re Herh

%91

2

Wolfgang Bach

%91

3

Anna Anna könig

%88

4

Charles Hughes

%86

5

Rachel May

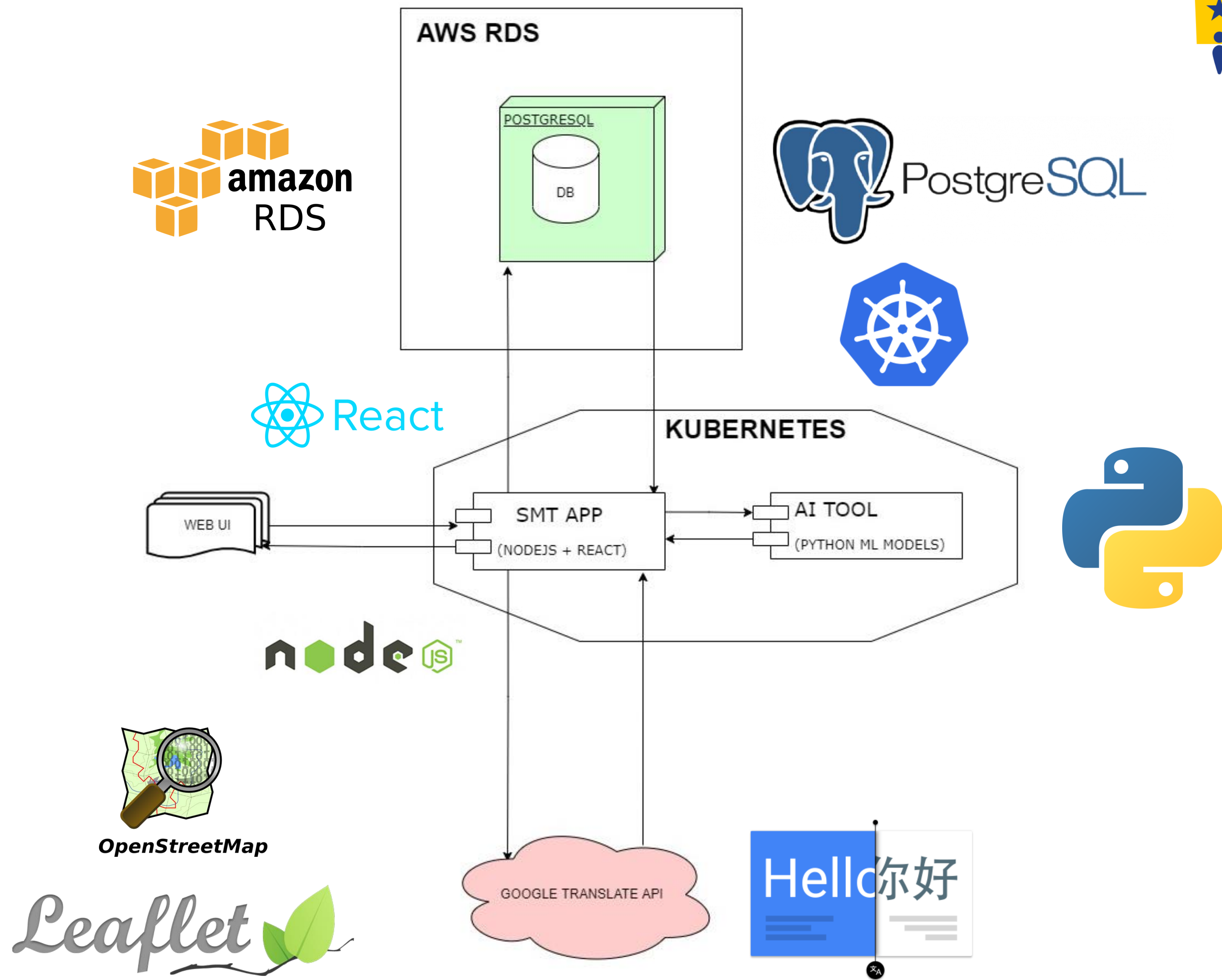
%53

criteria and other necessary information

BERT (Bidirectional Encoder Representations from Transformers)



Smart Matching Tool System Architecture





Privacy, Data Security and **GDPR** Compliance

Digital Logs

We keep log of every operation as long as the data subjects' data is processed.



AES-256 Encryption

Critical data (such as name, surname, email address and phone number) is encrypted.



Two factor authentication – 2FA

Login is protected with 2-factor authentication.



SSL connection

Secure connection between browser and server, server and database.



ID authentication with tokens

Tokens expire after 10 minute idle period then you need to login again.



No data transfer to 3rd parties

Except pseudonymised data for machine translation and geocoding.



Data stored in AWS Europe zones

Frankfurt/Germany



Three different user profiles

Admin, city admin, user



Data Protection Impact Assessment

A risk assessment about overall system design.



Data Processing Agreement

Clarusway as processor, municipalities + BtH as controller.



Transfer Impact Assessment

A risk assessment about data transfers.



Privacy Notice and Consent

Simple, graphical explanation about what we do with the data. Consent is our legal basis. Provided to the data subjects in multiple languages.





Shortfalls and Conclusion

- SMT is still in development phase. Evaluation of both the mentoring program and the application are yet to be finalized.
- SMT focuses on similarities. It matches people with similar preferences (not the other way around).
- Accuracy of machine translation varies, which effects the quality of the match.
- Publicly available training data for supervised machine learning models (labelled datasets) is missing particularly for social mentoring projects. Available ones hardly fit for purpose.
- Likewise, algorithms of similar commercial products (matchmaking sites, recommendation systems etc.) are not publicly available.
- Dynamic nature of the mentoring programme may result in suboptimal matches.
- If you identify too much criteria you may end up with zero match.
- **Machine Learning is a promising field and provides various options for matching.**



<https://orient8.eu>

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