HORIZON 2020

Digital Security: Cybersecurity, Privacy and Trust
H2020-DS-2015-1

DS-04-2015 Information driven Cyber Security Management
Grant n° 700176

Secure Information Sharing Sensor Delivery event Network[†]

Deliverable D2.5 version 1.1: Collaboration and data sharing portals

Abstract: This document specifies the collaboration and data sharing portals provided by the SISSDEN platform. These portals are dedicated for different types of users, internal and external to the SISSDEN project, including the public and individuals acting on behalf of their organizations (research, industry, National CERTs, LEAs, etc.). This deliverable presents the results of the efforts carried out in the task T2.4 “Sustainability and portal development” and takes into account the SISSDEN actors and part of public interfaces defined in D4.1.

Contractual Date of Delivery	31 December 2017
Actual Date of Delivery	2 January 2018
Revision	16 March 2018
Deliverable Security Class	Public
Editor	MI
Contributors	MI, NASK, CYBE, EXYS, POSTE, SHAD
Internal Reviewers	orig: POSTE, rev: EXYS, NASK, SHAD
Quality Assurance	NASK

[†] The research leading to these results has received funding from the European Union Horizon 2020 Programme (H2020-DS-2015-1) under grant agreement n° 700176.

The *SISSDEN* consortium consists of:

Naukowa i Akademicka Sieć Komputerowa	Coordinator	Poland
Montimage EURL	Principal Contractor	France
CyberDefcon Limited	Principal Contractor	United Kingdom
Universitaet des Saarlandes	Principal Contractor	Germany
Deutsche Telekom AG	Principal Contractor	Germany
Eclexys SAGL	Principal Contractor	Switzerland
Poste Italiane – Società per Azioni	Principal Contractor	Italy
Stichting the Shadowserver Foundation Europe	Principal Contractor	Netherlands

Abstract (cont.) The interfaces are derived from the SISSDEN requirements and use cases (D3.1) but will receive periodic updates throughout the lifetime of the project, to allow subsequent changes, improvements and optimizations to be included. As a result, the portals will be accordingly modified.

The portals described here will allow users to access publicly available data (e.g. website, news), provide the means to send feedback and control of their privacy, and give access to other types of data requiring subscription and validation by SISSDEN to external parties. The data includes remediation reports, metrics and aggregated statistics. As soon as curated reference datasets are fully defined, the next version of the portals will be developed to enable the publication and the sharing of those data sets.

Table of Contents

1 Introduction

1.1 Aim of the document

This document describes the user interfaces of the collaboration and data sharing portals provided by the SISSDEN platform. It explains the different features made available by the portals and accompanies the SISDEN deliverable D2.5 that corresponds to the portals themselves.

This document will serve as user manual for the portals and will be made available online.

1.2 Work that has been done by partners so far

The first version of the collaboration and data sharing portals has been published . Currently, this site is not publicly available and can only be accessed by the SISSDEN partners and external reviewers for tests and evaluation. It will be made available once it is ready for public use. The plan is to update it as the needs arise, as briefly explained in Section 4.

1.3 Structure of the document

The document starts with Section 1, that briefly introduces the deliverable and related tasks.

Section 2 lists the portals in scope of this deliverable.

Section 3 highlights several technical points of the Customer Portal and presents its functionalities and the user interface. It will serve to construct an online user manual guiding the users of the SISSDEN platform through the data sharing features offered by the Customer Portal.

Note that the screenshots presented in Section 3 are accurate as of December 28, 2017. The portal and its graphical design are continuously being updated and may therefore slightly differ from the images shown in this version of the report. The SISSDEN consortium may release an updated version of this document whenever considered necessary.

Section 4 briefly explains the Curated Reference Data Set. And Section 5 and 6 describe the Analytical Portal and Metrics Dashboard, respectively.

Section 7 summarises some future activities that represent the next steps that will be carried out to complete the development of the portals.

2 List of Portals

D3.3 described the high-level SISSDEN initial technical architecture; Fig. 1 presents a subset of the architecture diagram from this deliverable, highlighting the portals in the platform:

- Customer Portal
  - Curated Reference Data Set (a subset of the Customer Portal)
- Analytical Portal
- Metrics Dashboard

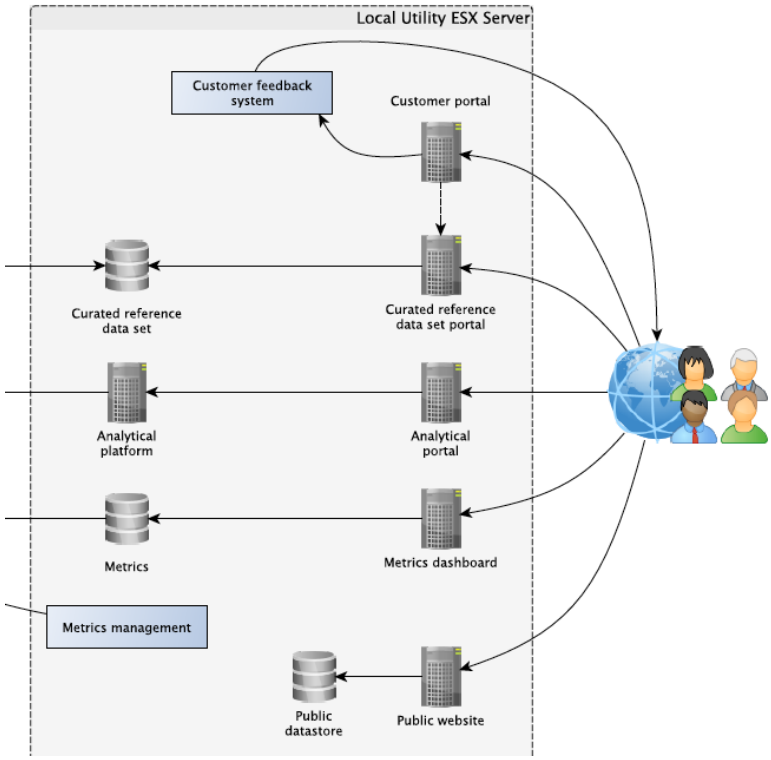

Figure 1: Subset of SISSDEN architecture, highlighting the portals

In addition, the relevant actors for each interface were described in D4.1. The following sections describe the functionality of each of the SISSDEN portals in more detail.

3 Customer Portal

The Customer Portal, which has successfully passed the test of the OWASP Zed Attack Proxy (a penetration testing tool for finding vulnerabilities in web applications) is developed using the following techniques, tools and modules:

- Development Environment:
  - Plain JavaScript
  - Node.js (run-time environment for executing JavaScript code server-side)
  - Express (JS framework)
  - MongoDB (Database)
  - NPM (package management)
  - Forever (CLI tool for ensuring the application runs continuously as a daemon)
  - Eclipse (code editor)
  - Apache2 (HTTP and HTTPS webserver)
- Dependencies (packages are used):
  - Nodemailer (for sending emails)
  - Express session (to handle sessions)
  - Body-parser (for parsing incoming requests)
  - Express (to make the application run)
  - Nodemon (restarting server when changes occur)
  - Mongoose (object data modelling to simplify interactions with MongoDB)
  - Bcrypt (for hashing and salting passwords)
  - Connect-mongo (for storing sessions in MongoDB)
  - Randomstring (for creating temporal verification code)
  - Helmet/X-XSS-Protection middleware[1] (for setting X-XSS-Protection HTTP header)
  - Helmet/Don't Sniff Mimetype middleware[2] (for setting Anti-MIME-Sniffing header X-Content-Type-Options to "nosniff")
  - X-Frame-Options[3] (for preventing clickjacking attacks)
  - Google reCAPTCHA[4] 2 (for anti-spam)

For the access control, the approach adopted follows the industry standard RBAC (Role-Based Access Control) model, as described in the standard ANSI/INCITS 359-2012. This approach is common in modern complex systems and enables scalable administration of large sets of users and resources without sacrificing granularity. The list of actors described in D4.1 maps to the set of necessary roles.

[1] https://github.com/helmetjs/x-xss-protection

[2] https://helmetjs.github.io/docs/dont-sniff-mimetype/

[3] https://www.npmjs.com/package/x-frame-options

[4] https://www.google.com/recaptcha/

For the authentication of the user, a standard username/password approach is utilized. The communication is protected using available industry-standard approaches (HTTPS-TLS). Passwords are hashed before being stored in MongoDB using the bcrypt[5] library. All personal information is stored in a secure database and is only accessible from the local host and is not used for any other purpose than to manage the accesses to the portals. Currently, the portals are deployed on a virtual machine in the cloud using AWS (Amazon Web Services) that provides the security, monitoring and management services needed.

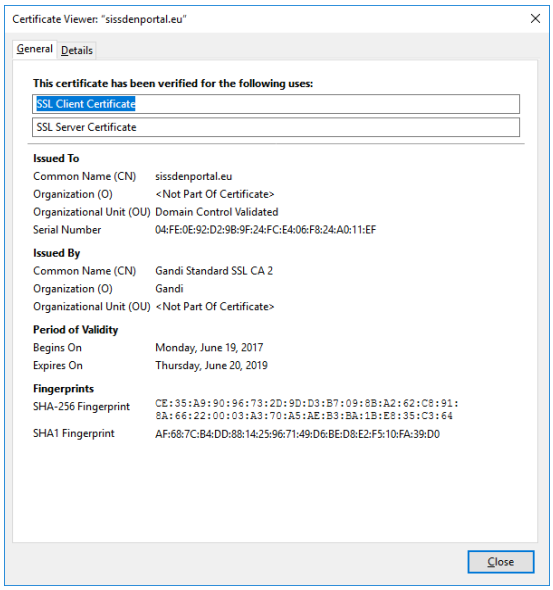

Figure 2: SISSDEN portal SSL/TLS certificate

3.1 Homepage

The home page (Fig. 3) presents the project and allows the user to log in or sign up.

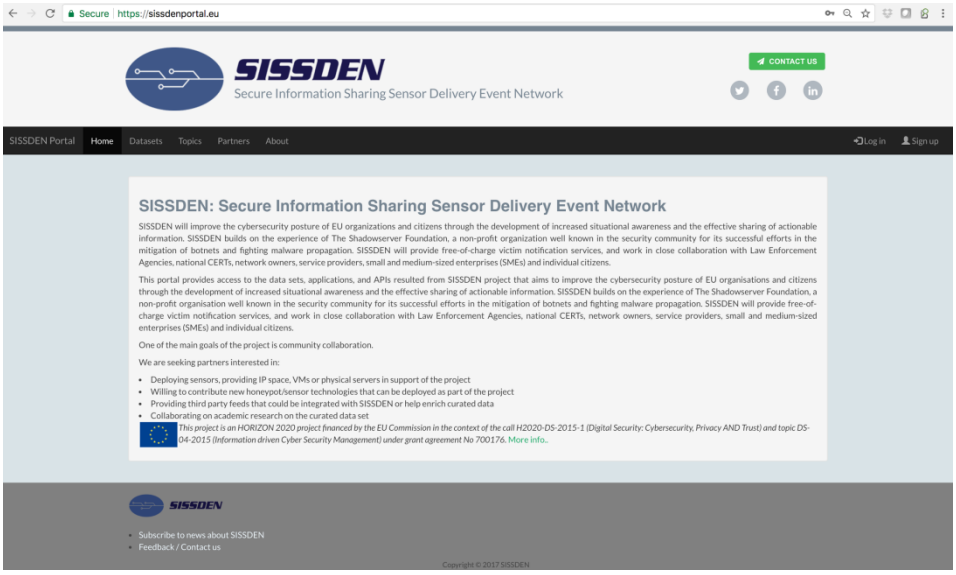

Figure 3: The portal's homepage

[5] https://en.wikipedia.org/wiki/Bcrypt

3.2 Account Sign Up

Main scenario:

An Anonymous User can visit the public SISSDEN Customer Portal and sign up for a free SISSDEN account by clicking on "Sign up". A pop-up window with a sign-up form will be displayed. Once the form is filled with all mandatory fields and the “Sign up” button is pressed, a mail including a confirmation code is sent to the indicated email address.

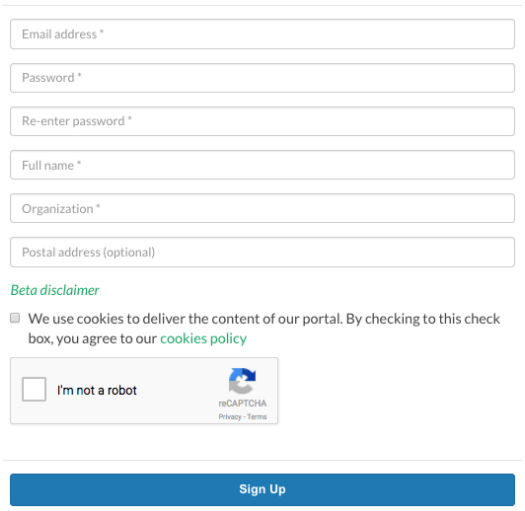

Figure 4: Sign up form

The browser is then redirected to a new page where the Anonymous User can enter the confirmation code to finish the registration process and become a User of the SISSDEN platform. The code is only valid for 24 hours. After this delay, the Anonymous User must redo the “Sign Up” procedure.

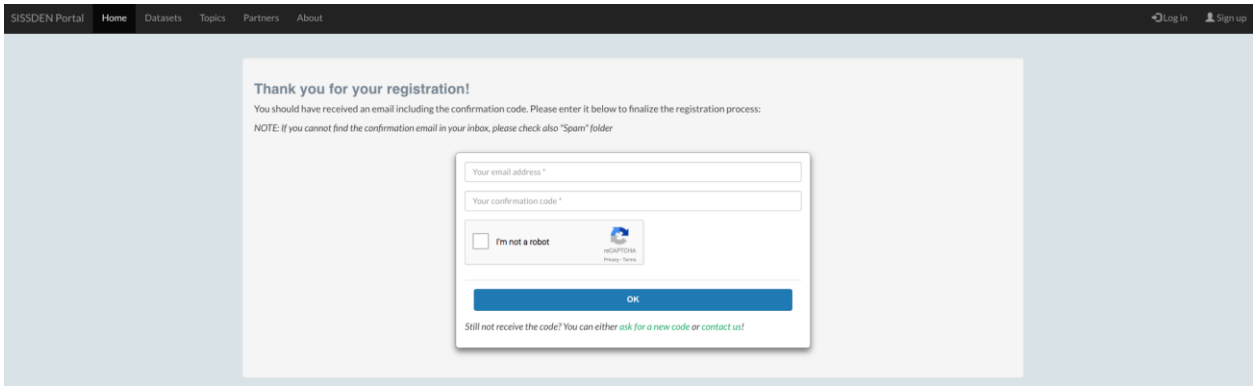

Figure 5: New user Sign Up - Confirmation page

If the correct confirmation code is entered, the registration process is completed:

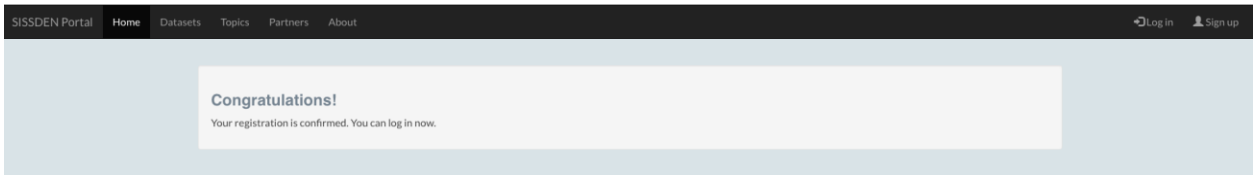

Figure 6: Acknowledgment page indicating that the registration was successful

Exceptions:

- The passwords typed do not match:

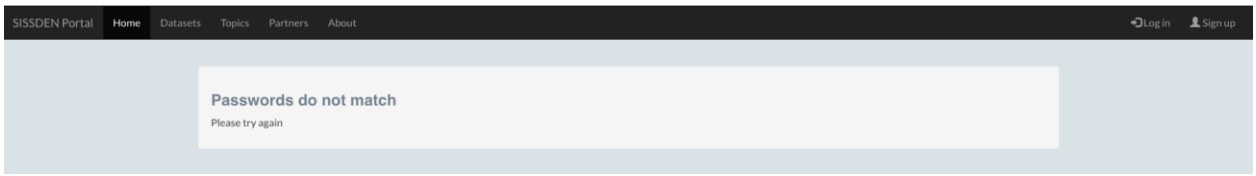

Figure 7: Notification that the two entered passwords for signing up are not the same

- The entered email address is related to an already registered account. A notification is raised with a link that allows the user to reset the password if needed (this will be discussed later in section 3.3). As indicated before, the all personal information is encrypted and/or securely stored.

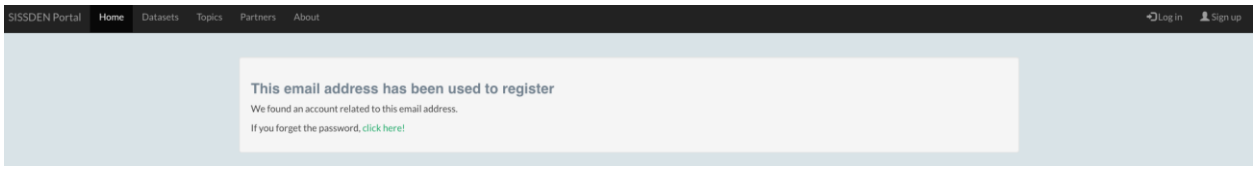

Figure 8: Notification that the account already exists for the given email address

- The Anonymous User has used the given email address to register but has not yet confirmed it using the confirmation code. A notification is raised with the links so that the Anonymous User can go to the page to enter the confirmation code or contact the portal's administrator for support.

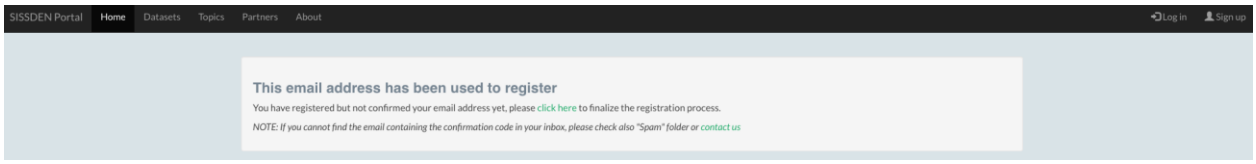

Figure 9: Notification that the given email address has already been registered but not confirmed

- The Anonymous User enters wrong confirmation code/email address or the confirmation code has expired. A new confirmation can be sent on demand.

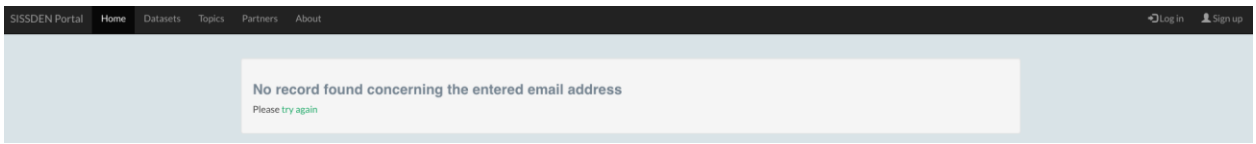

Figure 10: Notification that the email address entered is incorrect

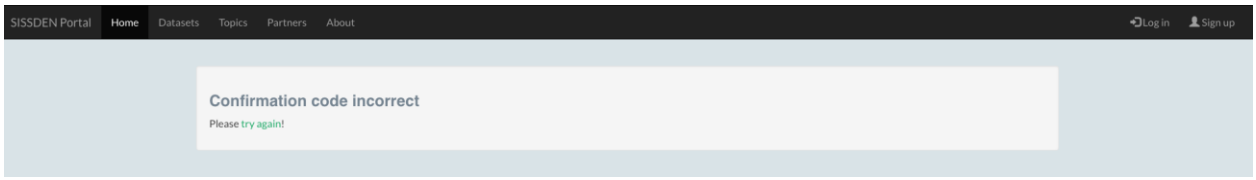

Figure 11: Notification that the confirmation code entered is incorrect

- The confirmation code expired (the code has only 24 hours of validity).

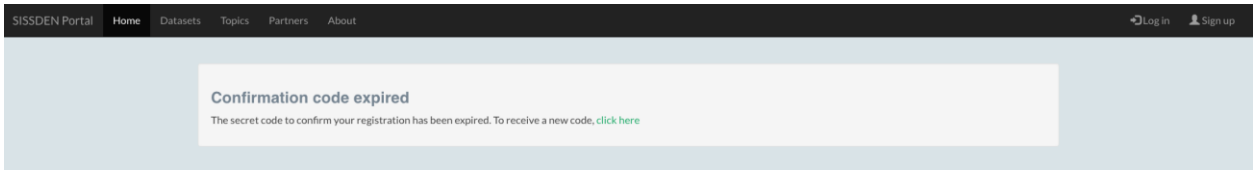

Figure 12: Notification that the confirmation code entered has been expired.

- The Anonymous User can ask for a new confirmation code in case it is expired or not received. This code will be valid for 24 hours since the moment it is created.

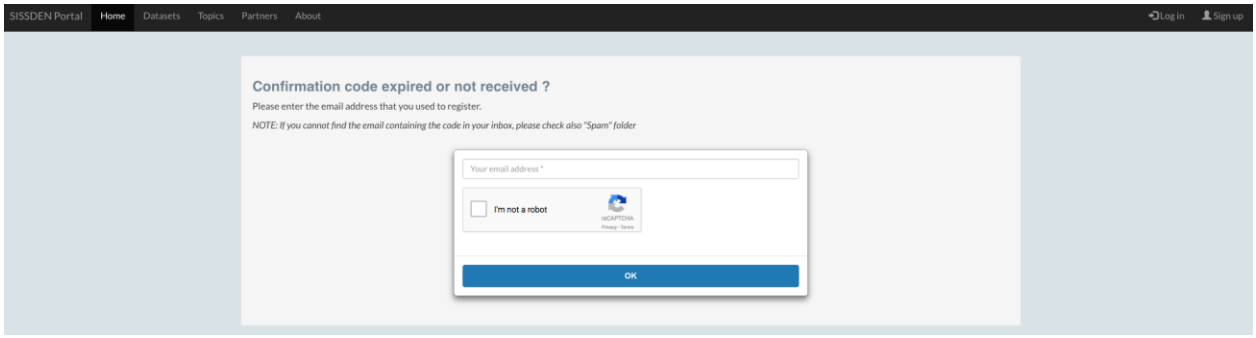

Figure 13: Form to ask for a new confirmation code.

3.3 Account Login

Main scenario:

An Anonymous User can visit the public SISSDEN Customer Portal component and log in his/her account by clicking on the "Log in" button. A pop-up window with a “Log in” form will be displayed:

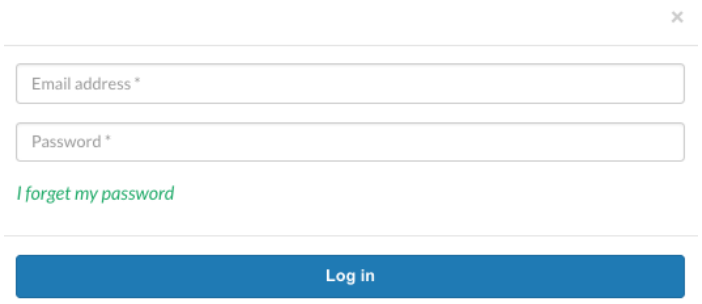

Figure 14: Account login

Once valid credentials are entered, the browser is redirected to the “User Profile” page:

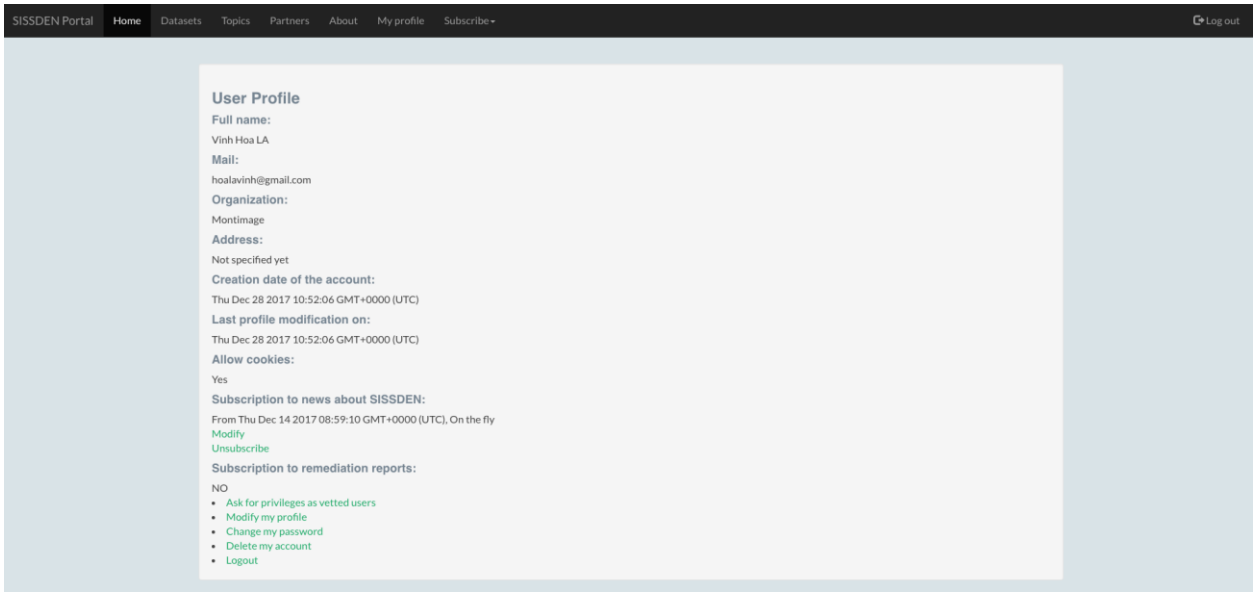

Figure 15: User profile page

Exceptions:

- Wrong username or password, or account not found

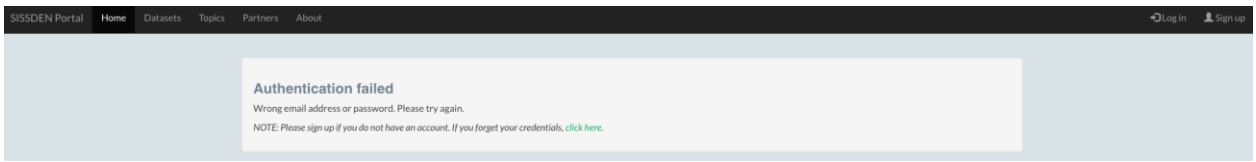

Figure 16: Notification of wrong log in credentials

- If the User forgets the password, he/she can click on “I forgot my password” then follow the instructions to create a new one (see Section 3.4).

3.4 Reset Forgotten Password

Main scenario:

Click on "I forgot my password" or go to the link "https://sissdenportal.eu/passwd_reset" to request a new one (i.e. to receive a code so that it can be reset):

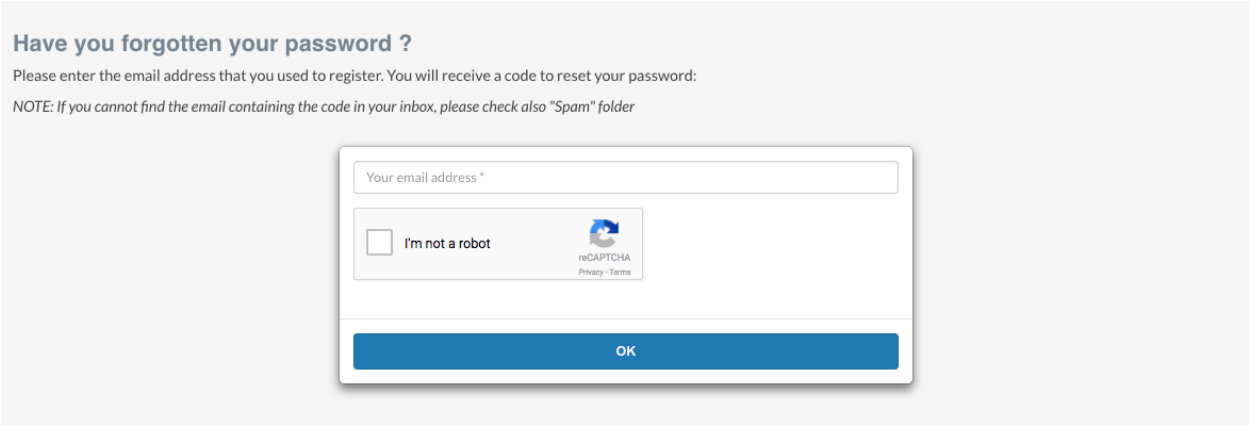

Figure 17: Form for requesting the reset of forgotten password

The User then needs to enter the code received via email and define a new password:

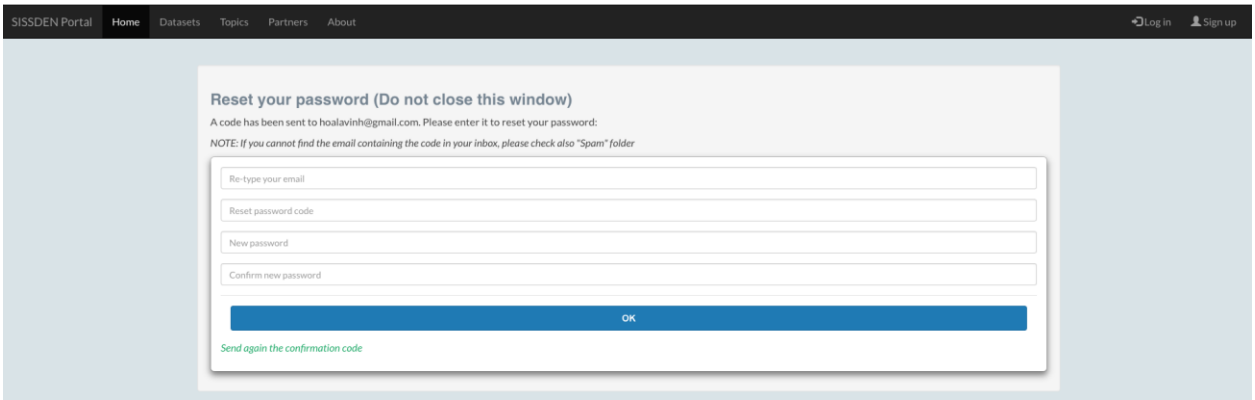

Figure 18: Form for defining a new password

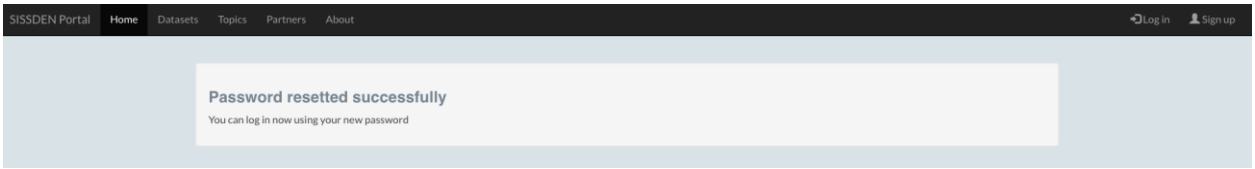

Figure 19: Notification that the password has been changed

Exceptions:

- Wrong email address:

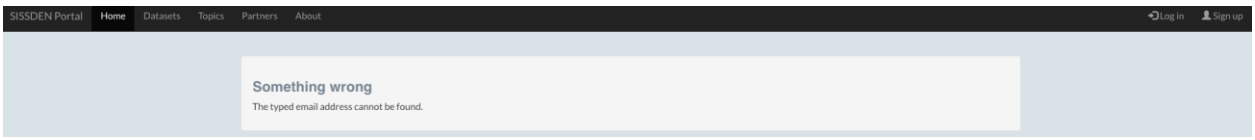

Figure 20: Notification that the given email address is incorrect

- New passwords do not match:

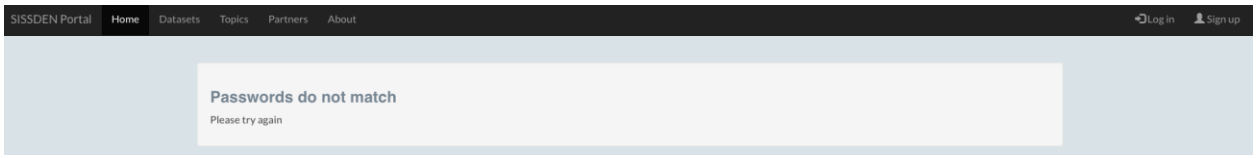

Figure 21: Notification that the passwords do not match

- Wrong reset code:

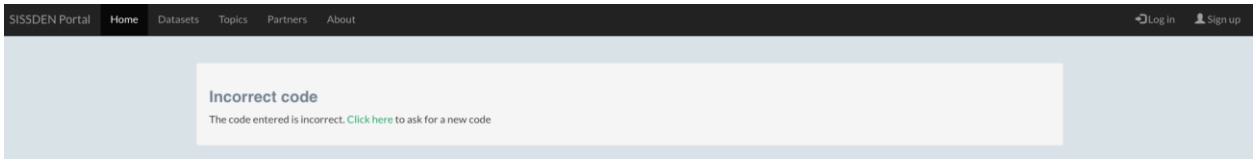

Figure 22: Notification that the confirmation code is incorrect

- Reset code expired:

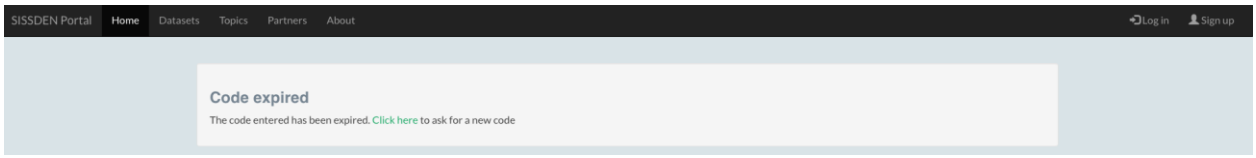

Figure 23: Notification that the confirmation code has been expired

3.5 Free Remediation Report Sign Up / Unsubscribe

Main scenario:

A logged in User can subscribe to remediation reports using the tag on the navigation bar or the link in the footer of the portal's pages.

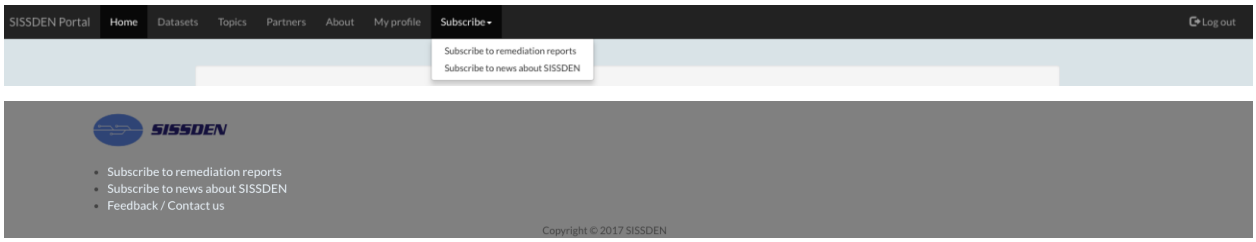

Figure 24: Links to subscribe to remediation reports

When the User clicks on the link in the menu or the footer, the subscription page will appear:

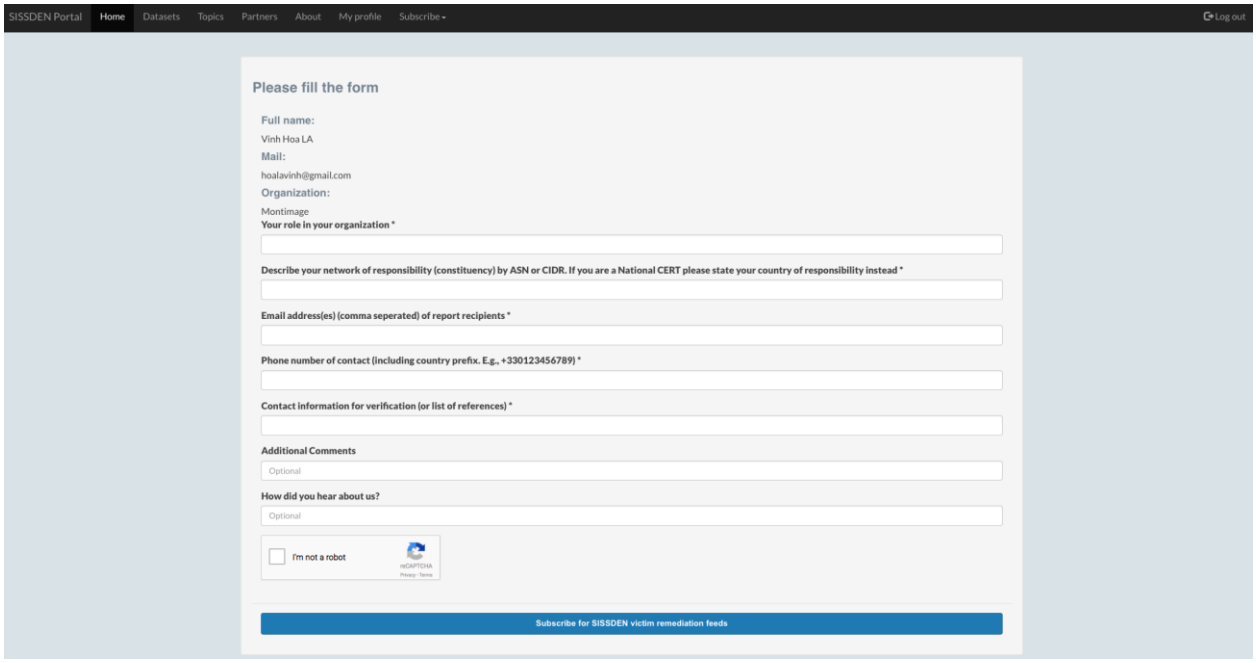

Figure 25: Remediation report subscription form

Once the form is filled in, a confirmation page will appear and an email notification will be sent to the subscriber. This request will be notified to the SISSDEN operator that will verify and approve/reject it. If approved, it will be transferred to Shadowserver Reporting System. A notification email will be sent to the subscriber to inform him/her of the decision.

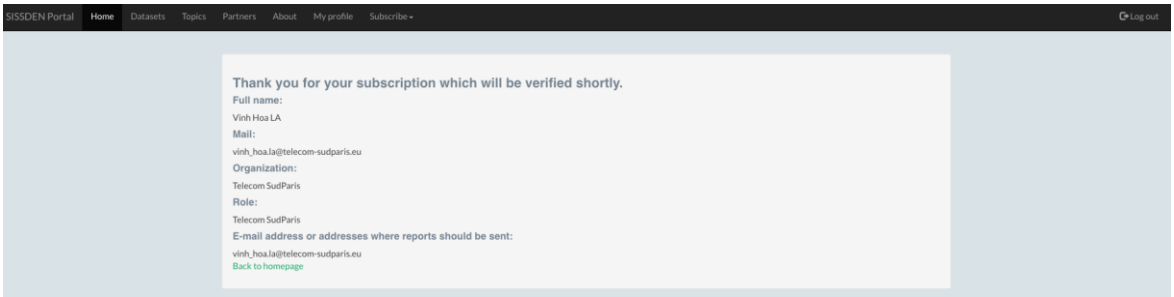

Figure 26: Notification that the request to subscribe to remediation reports has been received

To unsubscribe, the User can go to the personal “Profile” page and click to “Unsubscribe” in the section “Subscription to remediation reports”:

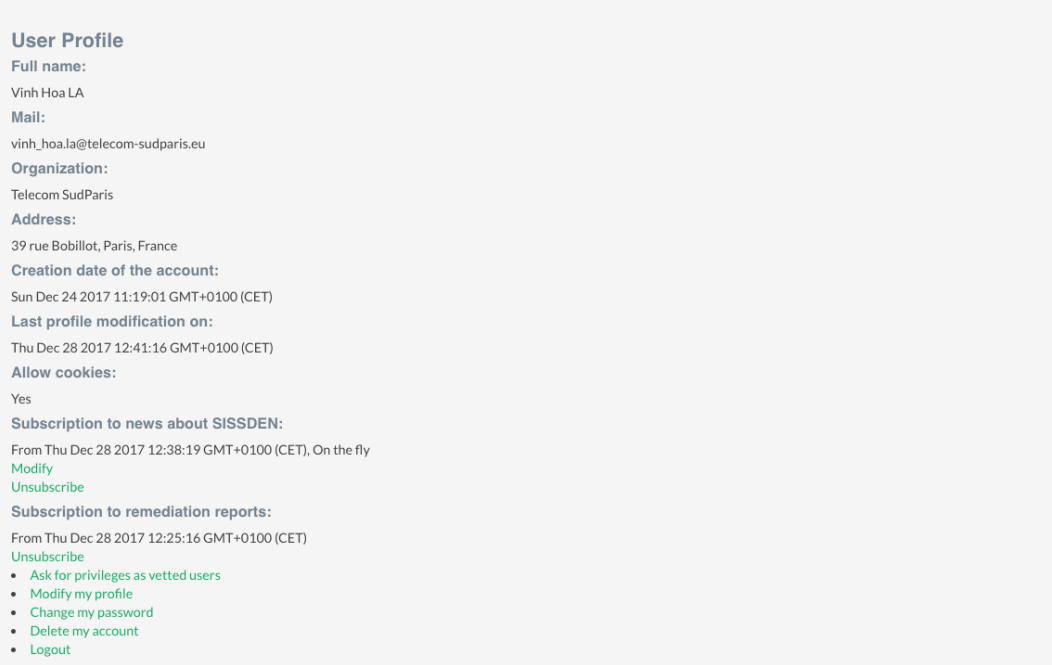

Figure 27: Profile page where the User can modify the subscription to remediation reports or unsubscribe

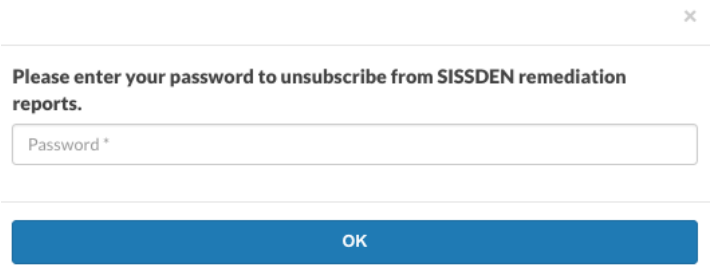

Figure 28: Form to unsubscribe from SISSDEN remediation reports

Exceptions:

- The email address entered by the User in the subscription form is already subscribed to remediation reports:

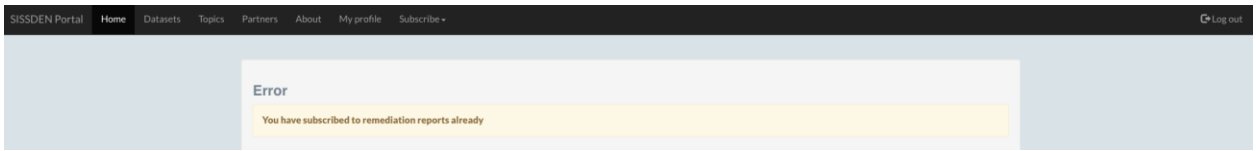

Figure 29: Notification that the email used for the request is already subscribed

- The User wants to unsubscribe but provides a wrong password:

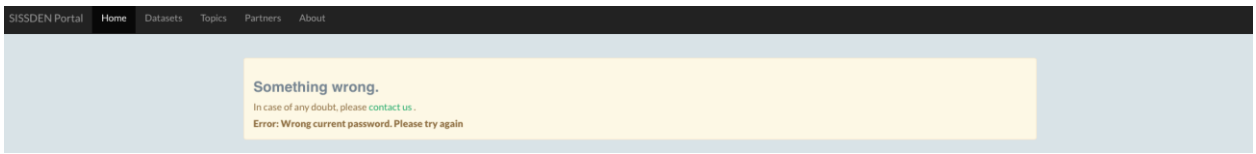

Figure 30: Notification that the entered password is wrong

3.6 Customer Feedback System

A User or an Anonymous User can provide feedback using the link in the footer of the portal's pages:

Figure 31: Page footer link to send feedback

The User can then use either the web form below or click on the paper plane icon to open his/her default email application:

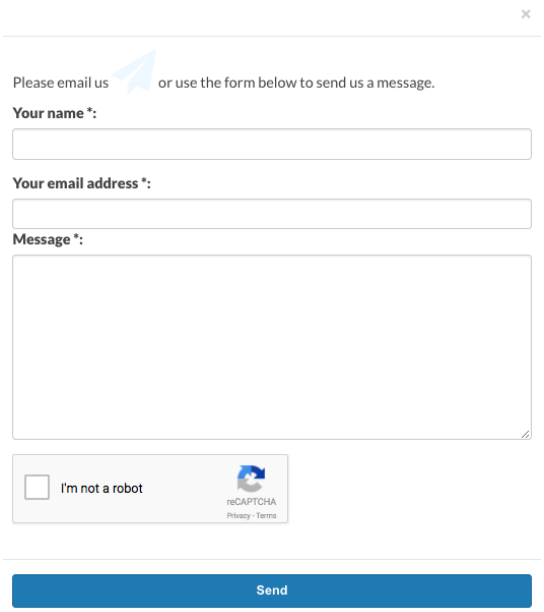

Figure 32: Form to send feedback

This feedback will be sent to the administrator (admin@sissdenportal.eu) managed by the webmaster appointed by the SISSDEN project.

3.7 View Public Information About SISSDEN

The menu bar of the portal has two tabs (Partners and About) redirecting to SISSDEN's website where one can find public information about the SISSDEN Project and about the Partners.

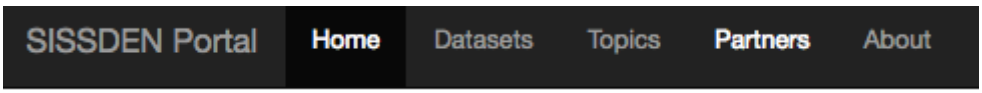

Figure 33: SISSDEN portal menu bar

3.8 Subscribe/unsubscribe to SISSDEN news

Main scenario:

A User/ An Anonymous User can subscribe to SISSDEN news and can parameterize the subscription so that he/she can receive news on the fly or combined in one mail each week or month.

Figure 34: Page footer link to subscribe or change subscription to SISSDEN news

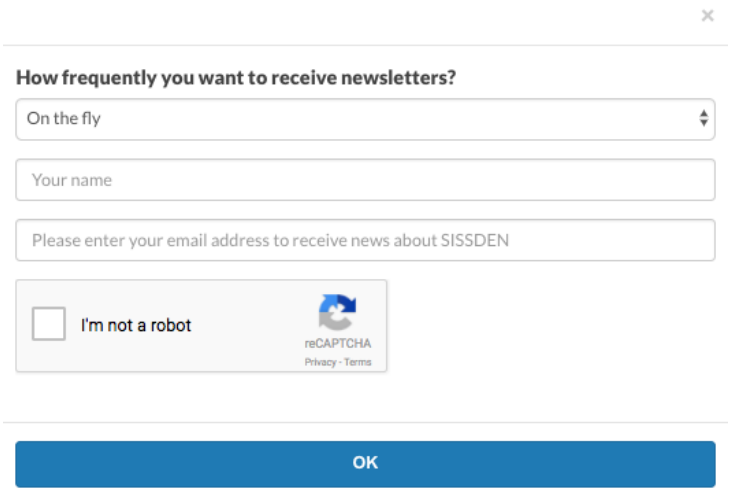

Figure 35: Form to subscribe to SISSDEN news

If a User enters his/her email address which is the one used to register on the portal, no additional verification is needed. Otherwise, if he/she uses another email, or in case of Anonymous Users, an email containing the confirmation code will be sent and an additional verification step is required:

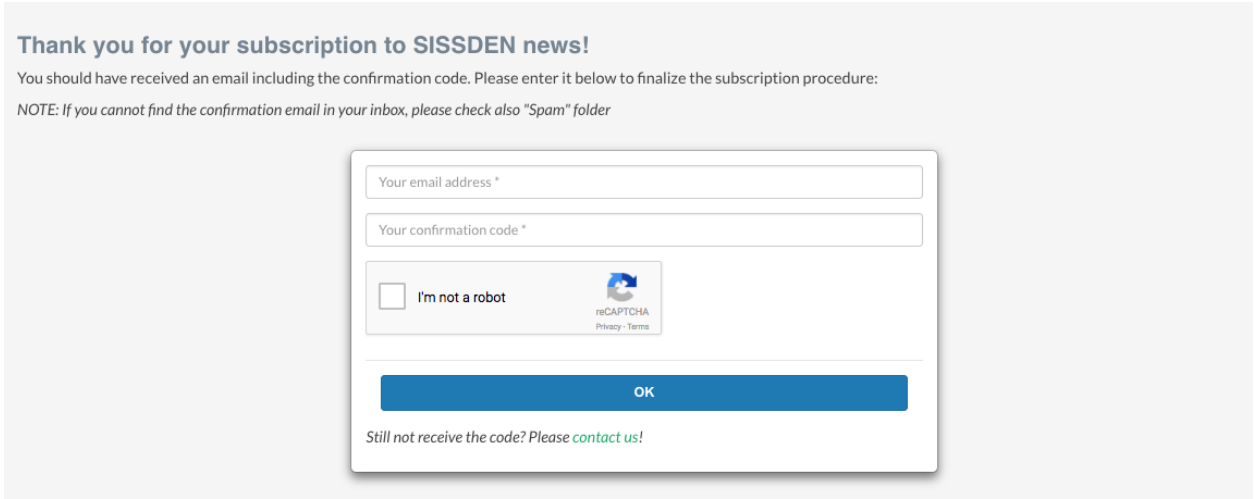

Figure 36: Confirmation page for subscription to SISSDEN news

Once the form is completed with valid information, the subscription is confirmed:

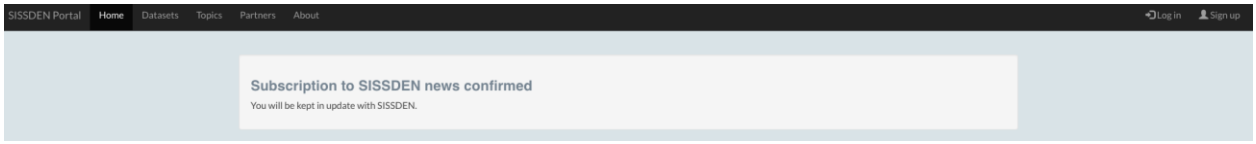

Figure 37: Notification that the subscription is confirmed

To change the subscription option, the User needs to open the profile page and click on the link to modify or unsubscribe:

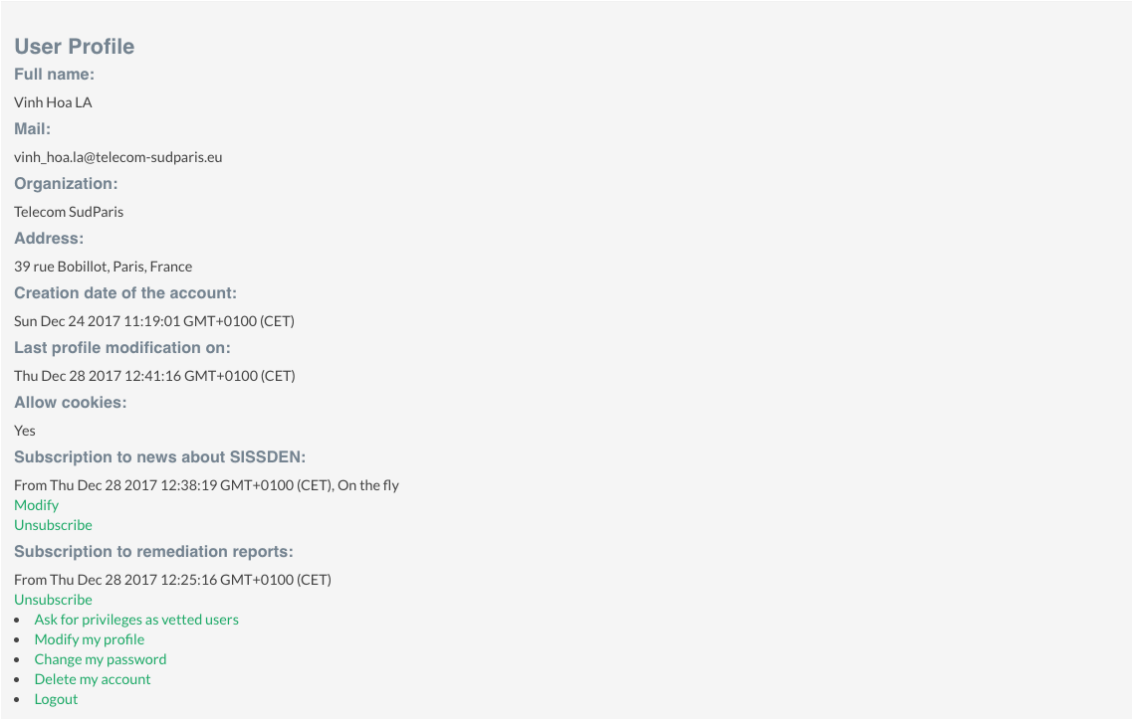

Figure 38: Profile page where the User can modify the subscription or unsubscribe

When the User clicks on “Modify” the subscription the following form appears.

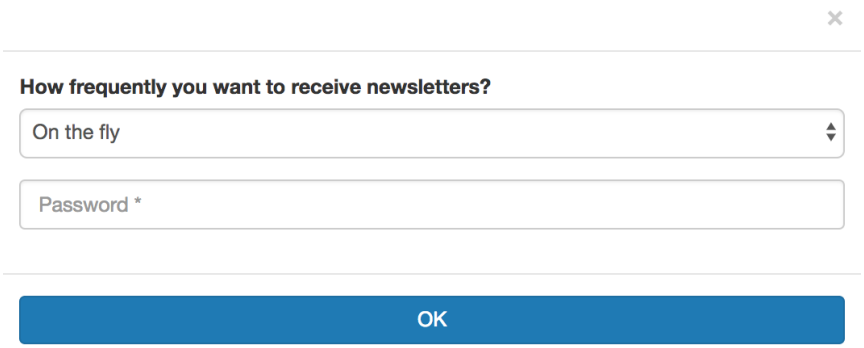

Figure 39: Form to change subscription options

When the User clicks on “Unsubscribe” the following form appears:

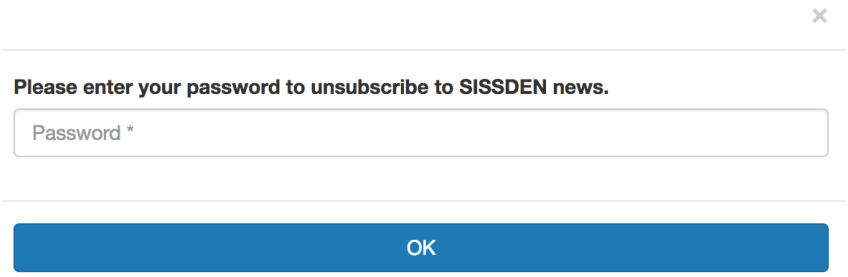

Figure 40: Form to unsubscribe to SISSDEN news

Exceptions:

- The Anonymous User/User uses an email address that is already in the list of subscribers to SISSDEN news:

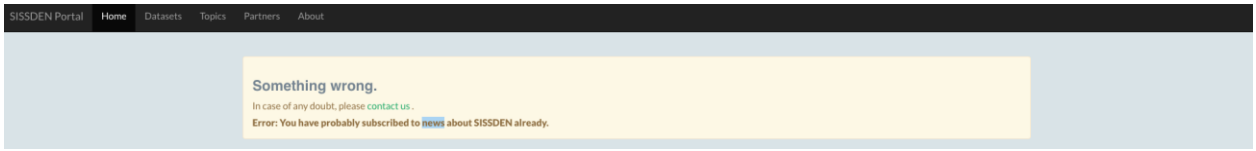

Figure 41: Notification that the User is already subscribed

- The email address typed on the confirmation page cannot be found:

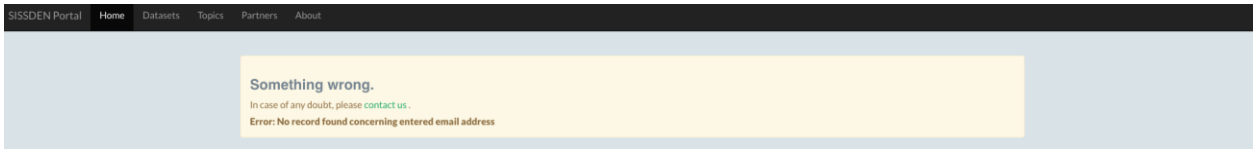

Figure 42: Notification that the email address entered is incorrect

- Confirmation code is incorrect or has been expired:

Figure 43: Notification that the confirmation code is incorrect

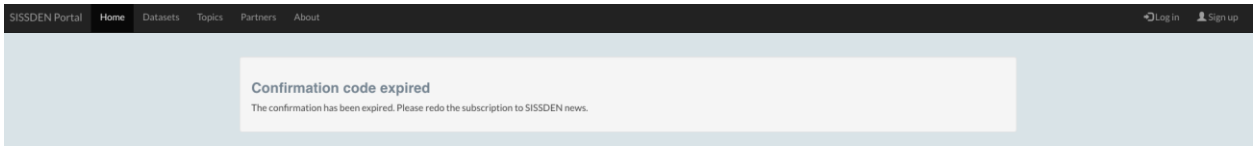

Figure 44: Notification that the confirmation code has been expired

- The User who wants to modify/unsubscribe provides an incorrect password:

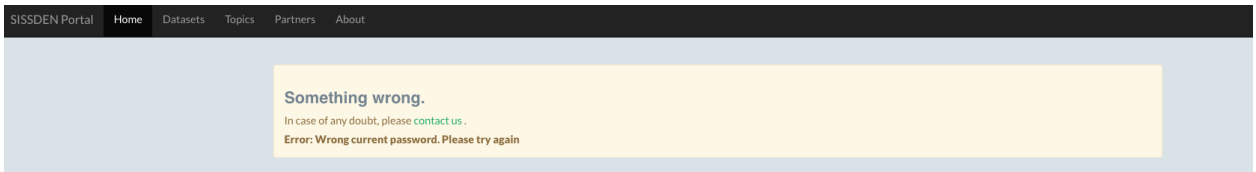

Figure 45: Notification that the password is incorrect

3.9 Manage SISSDEN User profile

Main scenario:

The interface that allows the Users to manage their own account information can be viewed via https://sissdenportal.eu/profile or by clicking on the “My profile” tab of the portal’s menu bar.

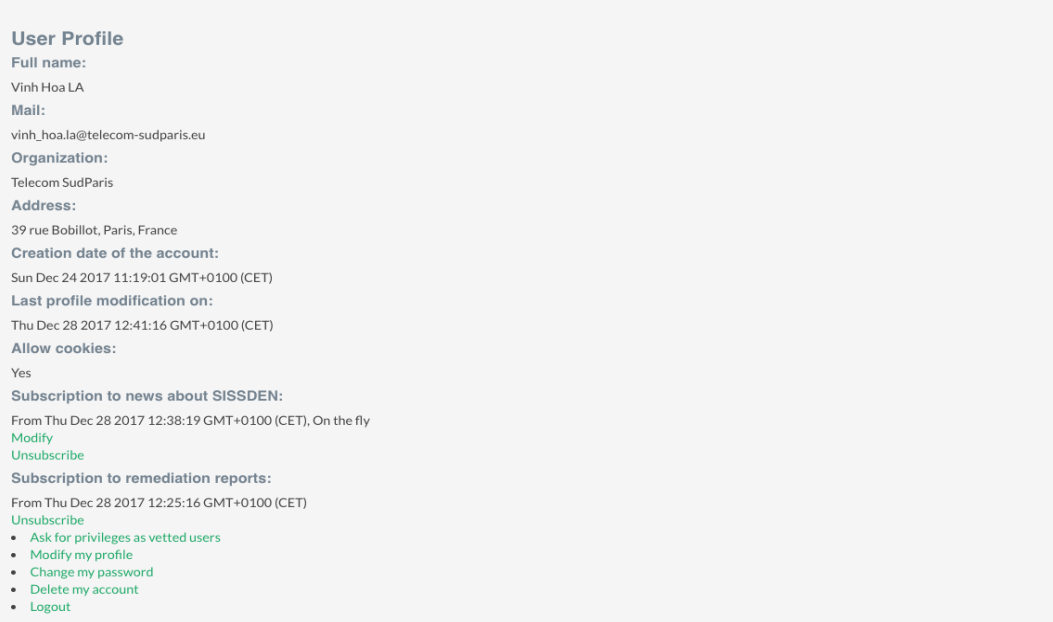

Figure 46: Profile page

From this page, an ordinary User can request to become a Vetted User (D4.1) by clicking on the “Ask for privileges as vetted users” link. This will open the following form where the user can choose the vetted user category he/she is requesting and a box that allows justifying this request. Once the user clicks on the OK button the request will be sent to the SISSDEN operator so that it can be verified and approved/rejected. SISSDEN operators will be notified by email about this request and the User will receive an email to inform him/her of any change in the status of his/her request.

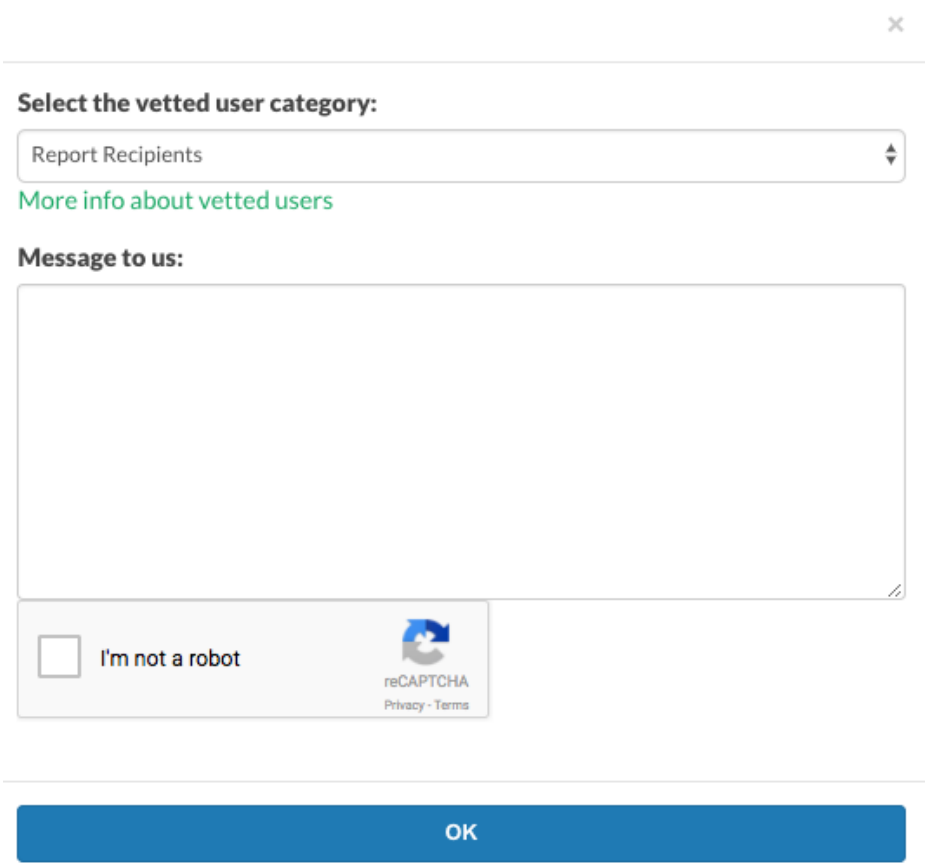

Figure 47: Form to request for vetted user privileges

The User can modify his/her profile, including his/her personal information as well as the password, by providing the current password. He/she can also delete the account. In this case, the password and the confirmation code received via email are needed to complete the deletion process. There will be an email sent to the User every time his/her profile is modified. If the account is deleted, the SISSDEN operator will be notified.

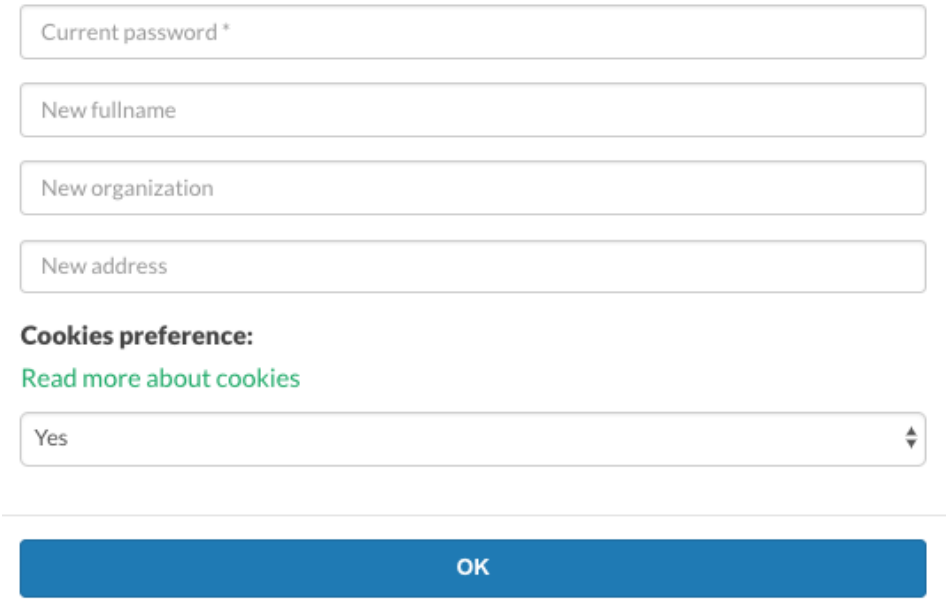

Figure 48: Form for changing the User's profile

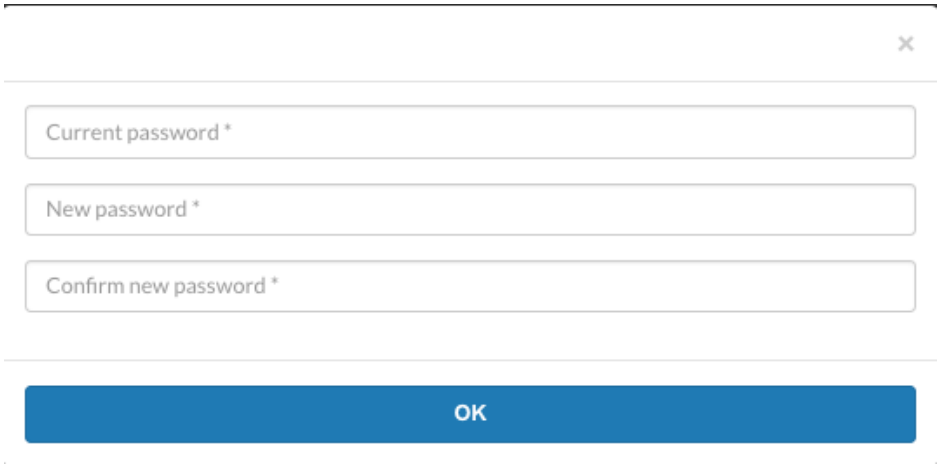

Figure 49: Form for changing the password

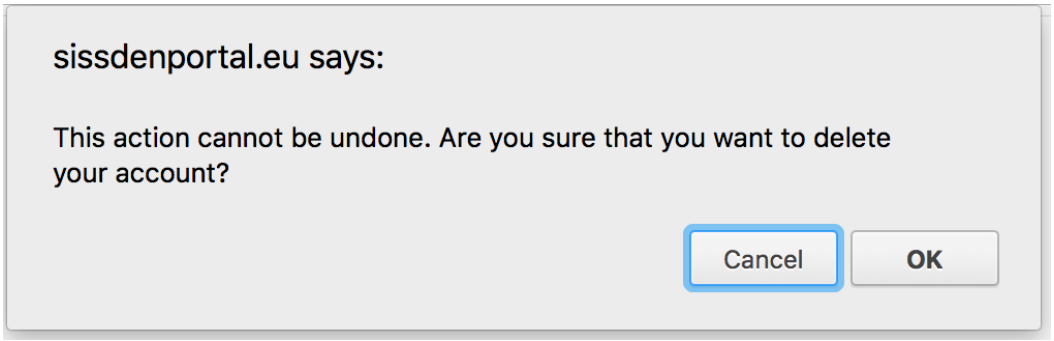

Figure 50: Confirmation for deleting the account

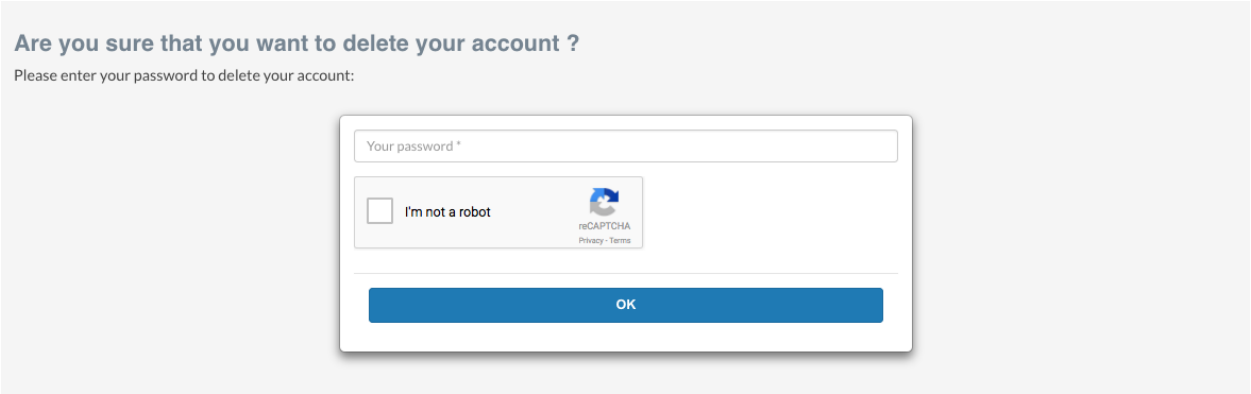

Figure 51: Form for deleting and account

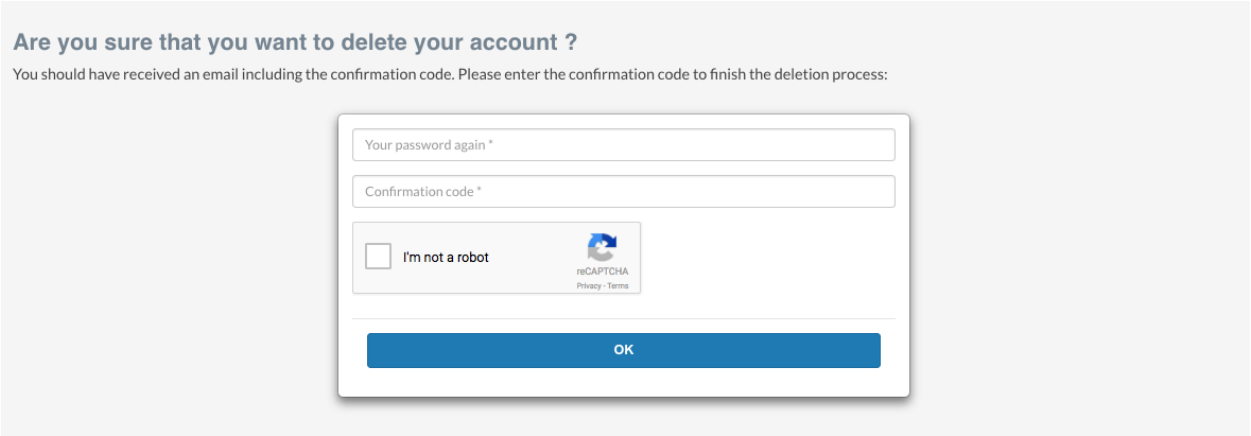

Figure 52: Form for confirming the deletion of an account

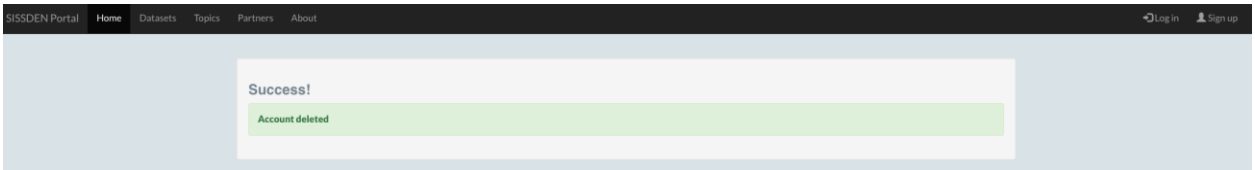

Figure 53: Notification that the account has been deleted

Exceptions:

- Wrong password:

Figure 54: Notification that the password is incorrect

- Incorrect confirmation code:

Figure 55: Notification that the confirmation code is incorrect

3.10 Account Log out

At any time, a logged user can log out by clicking the “Log out” tab on the menu bar. The corresponding cookie session will be terminated. If a User does not log out, he/she does not need to log in again the next time he/she is visiting the portal (even if the browser is closed) unless the cookie session expires. A cookie session is currently set to be alive for 24 hours.

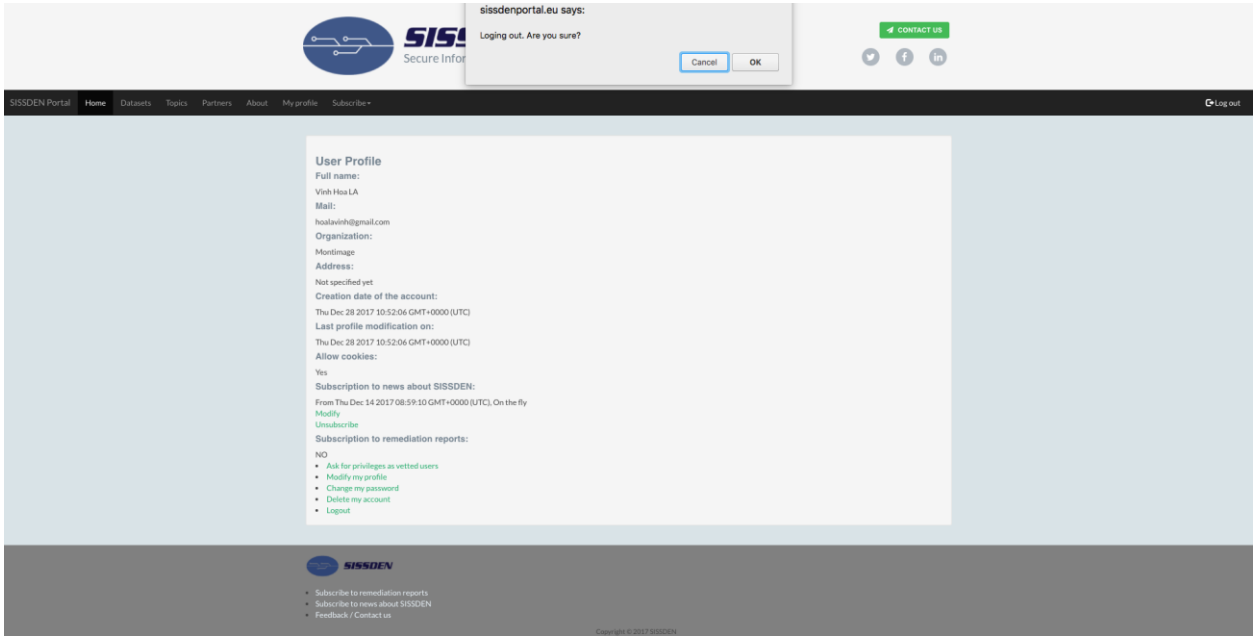

Figure 56: Form to confirm logging out

4 Curated Reference Data Set

The Curated Reference Data Set is not a separate portal but instead a series of data sets published in the Customer Portal. As defined in D3.1, it is one of nine key project objectives:

> ***Create and publish a large-scale curated reference dataset:***
>
> *This objective implies providing samples or datasets of malicious related activities for the research community*

From a user interface perspective, it is defined in D4.1 in Section 4.12 and 4.13.

This section will be updated when the Curated Reference Data Set is published on a section of the Customer Portal.

5 Analytical Portal

The SISSDEN's Analytical platform will allow the processing and representation of the data collected by the SISSDEN sensor network and through other means. This data needs to be interpreted, processed, queried and visually represented. The Analytical platform will also provide tools (e.g., for performing statistics and applying basic machine learning methods). These functionalities will be made accessible via the SISSDEN portals. Thus, the specification of the Analytical platform in D5.2 will impact the development of the portals presented in this document D2.5. The user interactions and views provided by the portals related to the Analytics is referred to as the Analytics portal.

5.1 Main components provided by the Analytics portal

The main objective of the Analytics portal is to provide an integrated access and view to the Analytical platform and related tools that has, as much as possible, the same look and feel as the other SISSDEN portals and web site.

The Analytical platform is currently being discussed in SISSDEN and a final version needs to be specified. Nevertheless, Nevertheless, we give a description below of what should be the definitive architecture. The Analytics portal has to basically provide an integration with the SISSDEN Analytics Web User Interface (Web UI) . The Analytics Web UI will offer the following features to the users:

- Query the data collected by SISSDEN and made available to the Analytics platform

  The format of the queries will be Query DSL for Elasticsearch queries and Amazon Athena for Amazon S3 queries. The platform integrates, respectively, a JSON file manager for Elasticsearch queries and accessing results; a customized service for managing Amazon S3 queries and outcomes, built-in objects for visualising results and a web file manager for accessing results that are contained in files of different formats.

- Provide access to different features according to the type of user.

  The Analytics portal differentiates users in such a way as the different modes of access need to be provided for:

  - Non-expert users: predefined queries but with filtering capabilities, provided by a simple web interface
  - Normal users: predefined and user-defined queries with a form-based interface, provided by an intermediate web interface
  - Expert users: fully-featured query scripting language (DSL json), provided by an advanced web interface

- Output are presented in tables, graphs, and/or as files in different formats. The files can be image files, CSV files, PCAP files, MISP/STIX and/or results in JSON files. To deal with files, the portal will integrate a web-based file managing system (e.g., nodejs fs file system[6], awesome-nodejs[7], graceful-fs[8], and for Amazon S3: s3commander[9], aws-js-s3-explorer[10]) and a database for storing indexes (e.g., MongoDB).

- Export results. User will be able to download and save results on a local machine.

  The Analytical platform is built with a three-tiers architecture:

[6] https://www.w3schools.com/nodejs/nodejs_filesystem.asp
[7] https://github.com/sindresorhus/awesome-nodejs#filesystem
[8] https://www.npmjs.com/package/graceful-fs
[9] https://github.com/nimbis/s3commander
[10] https://github.com/awslabs/aws-js-s3-explorer

- **Data tier**: read data coming from remote Elasticsearch and S3 servers
- **Middleware**: in Node.js, to decouple data source and presentation
- **Presentation tier**: present data to users on a AngularJS + Bootstrap-based Web UI

The Analytical platform architecture is shown in the following scheme:

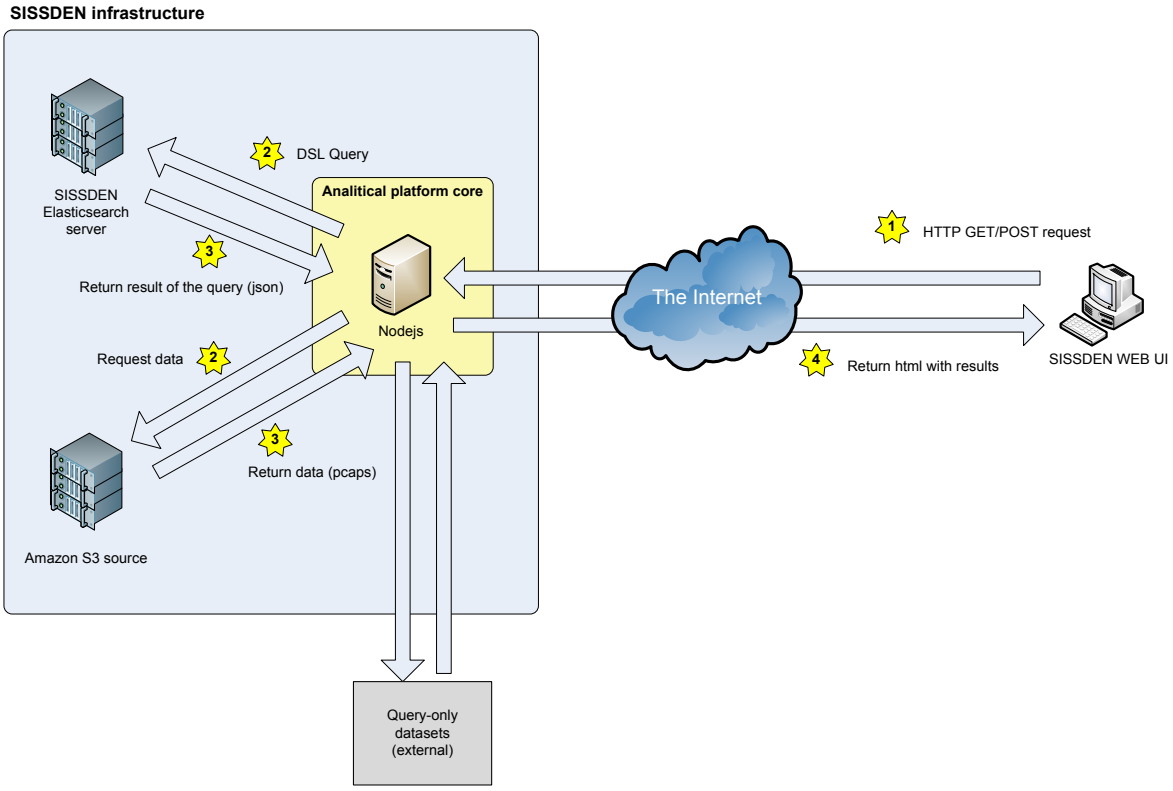

Figure 57: Analytical Platform architecture

Referring to the numbered stars in the figure, the functioning of the platform is:

1. The operator interacts with the WEB UI by querying the node.js middleware through a RESTFul service (HTTP GET/POST/DELETE requests).
2. The node.js middleware dispatches the query to the sources: if the source is an Elasticsearch server, the query is in DSL format; if the source is an Amazon S3 server, the request is a simple data-file download.
3. The source returns the data to the node.js middleware in json format if the source is an Elasticsearch one or in a pcaps file format if the source is Amazon S3.
4. Node.js prepares a HTML page with the results and send it back to the AngularJS + Bootstrap-based Web UI.

The Queries interfacing in the Analytical portal still waits to be agreed by the partners and therefore is subject to changes.

Besides presentations in tabular and graphical forms, the Analytical platform will also enable the user to perform various types of analysis on data captured by the SISSDEN infrastructure, in particular:

- Statistical analyses
    - Both univariate and multivariate

  - Time series analysis of attacks (information coming from honeypots)
  - Average, variance and standard deviation of amount of honeypot attacks over a time range
  - Median, mode and percentiles of honeypots attacks over a time range
  - Max/min amounts of attacks over a time range
  - Amount of attacks per source IP and destination IP
  - Amount of attacks per source port and destination port
  - Amount of attacks per source country and destination country
  - Correlation coefficients among two variables (for instance, between source country and destination country).
- Machine learning
  - Unsupervised algorithms, to discover features
    - k-means clustering
    - Logistics regression, Linear Discriminant Analysis
    - Principal Component Analysis
    - SVM (Support Vector Machine)
    - Neural networks
  - Supervised algorithms, to extrapolate trends
    - Linear regression
    - Local weighted regression

The Analytics portal also provides easy access to tools and manuals that can be used for performing statistics and applying machine learning algorithms to the results obtained from the queries.

The portal will offer web pages containing the components provided by the Web UI to:

- Create, edit, select, parametrise, print, delete and execute **queries**;
- View, select, save, export, parametrise, print and delete **results** (files or tables/graphs).

6 Metrics Dashboard

6.1 Purpose

The Metrics Dashboard is one of the three "portals" to be made available by SISSDEN. Its purpose is to fulfil one of the project's nine objectives, defined in D3.1 as:

> ***Provide objective situational awareness through metrics:***
> *This objective implies providing metrics that help communities make security decisions.*

The "dashboard" part of the name refers to the intention to display various types of metrics in one consolidated location.

According to D2.3, the purpose of the Metrics Dashboard is to provide a website that is publicly viewable and contains interesting metrics. Since this will be the only project output (other than the main website) which is publicly viewable, it will enable the SISSDEN project to gain more exposure and find new users.

In addition, one of the key features of the Metrics Dashboard is that it should enable data to be explored from a high level (public metrics) down to a lower level (commercialised offerings).

Given these factors, it is important that the homepage of the Metrics Dashboard is one that draws the user in immediately and enables data to be interactively explored, even when viewed publicly. Therefore, the homepage of the Metrics Dashboard is a world map, focused by default on Europe, which colour codes countries according to various metrics at country level.

In D4.1, the Metrics Dashboard fulfils the public interfaces defined in Section 4.8 and 4.9.

6.2 Availability

It is intended to be made available on a subdomain of the main SISSDEN domain, at https://metrics.sissden.eu.

The intention is to split the metrics into:

a) **Public metrics:** These metrics can be viewed by any internet user, whether or not they are authenticated.
b) **Advanced metrics:** These metrics are more advanced (either in design or functionality) or are at a lower level of data. These could be to a combination of commercial users and vetted researchers, albeit with different levels of access. Vetted researchers will have access only to advanced metrics that relate to their own network. Access levels for commercial users is being explored in more detail in D2.9, but the portal is being designed so that it can easily cater to either of these types of authenticated users.

User data is intended to be shared between the Customer Portal and the Metrics Dashboard, in order to establish whether the user is vetted to receive advanced metrics. In addition, user profiles are intended to be shared with the Analytical Platform, since these two portals both have the possibility of future commercialisation (according to the initial work in D2.3). It is, however, yet to be decided whether the two portals will share SSO (single sign-on) authentication. Whether SSO is or is not utilised, two-factor authentication will be implemented to increase the security of private data.

6.3 Content

Since the specifications of the metrics themselves have not yet been published, the contents of the Metrics Dashboard are subject to change. However, the structure is expected to be as shown in Fig 58:

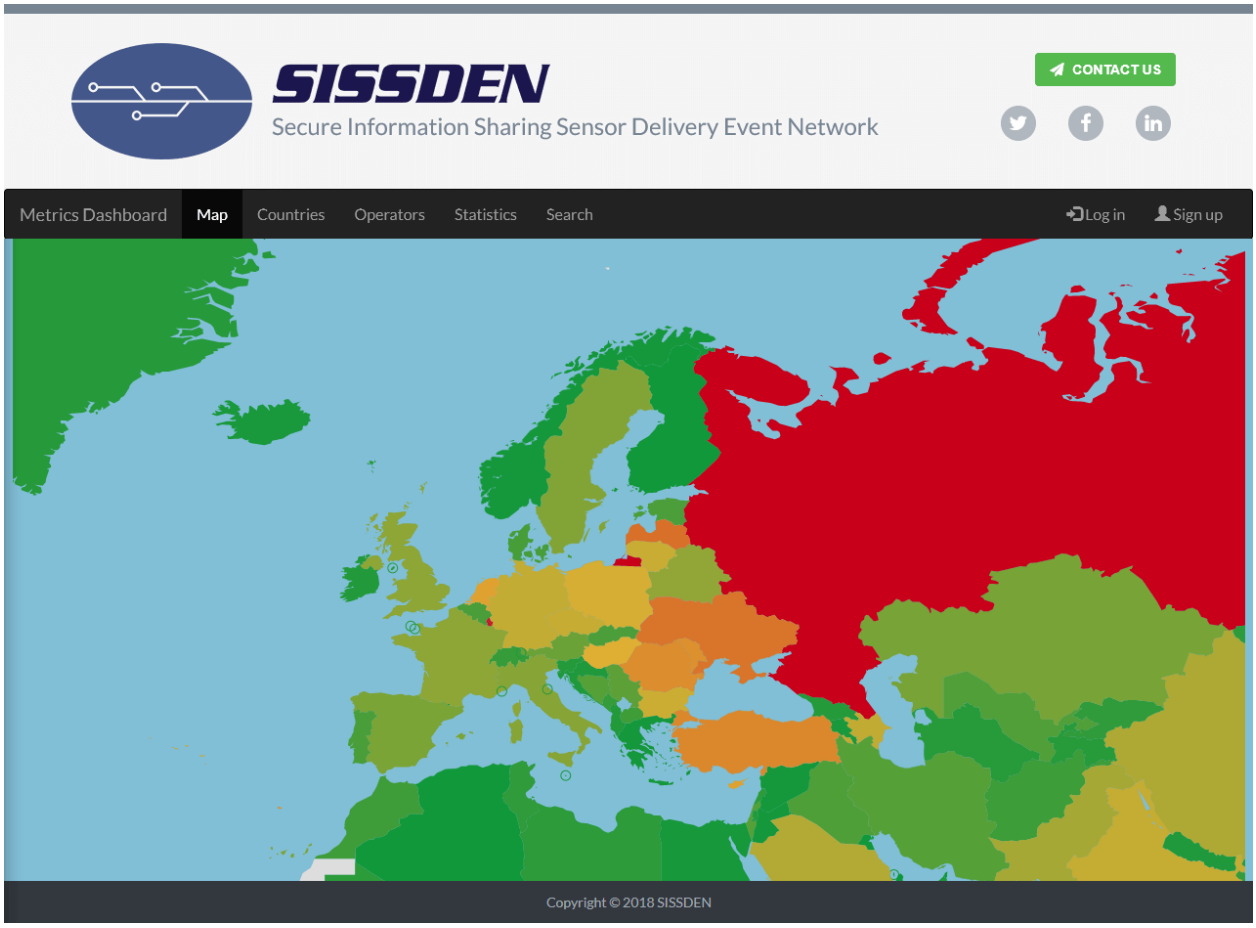

Figure 58: Map view

Figure 59: Expand map view

- **Map**
  The Map page is the default page that loads and is therefore the first page that most users will see when visiting the Metrics Dashboard. Even guests can immediately interact with the map and explore the public metrics. For example, by selecting a country (see Figure XX), details about that country can be displayed, and then the data can be explored at a lower level. When the requested data is an advanced metric rather than a public metrics, authentication is requested and the process of registration is explained.

- **Countries**
  The Countries page consolidates metrics at country level (e.g. countries with most botnet reports). Guests will be able to see basic lists, whereas users with additional privileges will be able to see more advanced metrics.

- **Operators**
  Similar to the Countries page, except metrics are consolidated at operator level e.g. according to the hosting company or ISP. Similarly, guests will only be able to see public metrics.

- **Statistics**
  The Statistics page lists a variety of high-level global metrics that are expected to be of interest. This will include, raw metrics (e.g. total number of botnets observed in the EU) and proportional metrics (e.g. 30% reduction in spam emails compared to previous month). The metrics that are given priority on this page are those that are objectively significant e.g. large monthly changes, all-time high levels, etc.
  In addition, this page will display cost metrics to demonstrate the level of financial impact that the SISSDEN project is potentially having. The level of accuracy of these metrics will be made clear.

- **Search**
  The Search page enables users to build queries to discover metrics of interest. For example, the dynamic form enables a user to search for “ASNs with more 1% of global brute force reports in March 2018”.

- **Profile**
  The Profile page is only displayed when the user is authenticated (see Fig. 59). It enables details of the user’s profile to be viewed and edited.

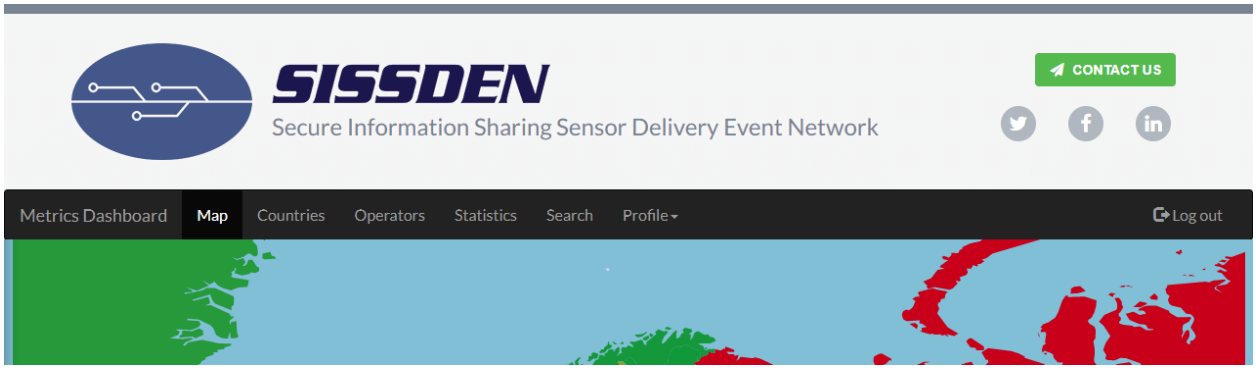

Figure 59: Profile menu option

7 Future work

As soon as the Curated Reference Data Sets are fully defined by SISSDEN partners, the Customer Portal will be upgraded with the functionalities described in the deliverable D4.1 sections 4.8 to 4.13 concerning the display of metrics, indexing data sets, etc. and D5.1 concerning the access to the analytics platform. The portal will also be eventually updated by taking into consideration the feedback received through the Customer Feedback System.