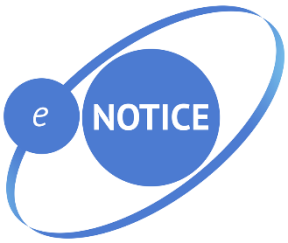

eNOTICE
European Network Of CBRN TraIning Centres

D3.8 Report on eNOTICE information and communication platform full operational version (V1)

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Executive Summary

This deliverable describes version one (V1) of the eNOTICE web-based platform, the first fully operational version. The following steps are taken:

First, the methodology used for research (design science), requirements gathering (based on D3.6) and software development (agile SCRUM) are described.

In the second step, the requirements gathering methodology is applied to gather requirements for the eNOTICE web-based platform, for example via surveys, workshops at Joint Activities and continuous feedback provided by the end-users. Finally, a combined list of requirements is presented.

As a third step, related work regarding web-based information and communication platforms is analyzed and assessed.

In the fourth step, all previously gathered information is used to describe the concept and architecture of the eNOTICE web-based platform as well as present the user interface and other relevant aspects.

Lastly, the features implemented are compared to the previously identified requirements with the result that virtually all required features were implemented.

The platform itself can be found online at https://www.h2020-enotice.eu/ and in D3.9.

Abbreviations

CBRN	Chemical, Biological, Radioactive and Nuclear
ECC	eNOTICE Community Center, synonym for web-based platform
EU	European Union
FAQ	Frequently Asked Question
GDPR	General Data Protection Regulation
JRC	Joint Research Centre
KPI	Key Performance Indicator
TC	Training Center
V1	Version one
WP	Work Package

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1 Introduction

The following chapter will present a short motivation for this deliverable and the objectives it wants to achieve. Furthermore, it describes the relation to other tasks and an outline of the deliverable.

1.1 Motivation

The eNOTICE Community Center (ECC) is a web-based information and communication platform. It is an important tool to provide information on the eNOTICE project and (public) access to information about the training centers (TCs) which are members of the eNOTICE network. This empowers researchers, technology developers and first responders to easily find and contact TCs according to their individual needs.

Additionally, the ECC provides communication facilities which any user can use to communicate and collaborate. This enables users to e.g. share best practices, engage in discussions about common topics of interest or to plan events together.

Furthermore, all these features are available in a user-friendly and intuitive way.

1.2 Objectives

The main objective of this deliverable is the documentation of the state of development of the information and communication platform. Secondary objectives are the description of the requirements gathering process and the requirements gathered, the research of the current state of the art regarding networking platforms and a short evaluation of the ECC.

This deliverable directly contributes to objective 2 of eNOTICE (establishment of a web-based platform) while providing visibility and supporting instruments for the results regarding objective 1 (elaboration of a European network of CBRN TC) and objective 3 (set up of an operational transactional network for optimizing investments by pooling and sharing resources).

1.3 Relation to other tasks

This section will present a short overview of the tasks related to Task 3.2.

1.3.1 Task 2.1 – Roster of CBRN Training Centers capacity and elaboration of a CBRN Training Centre Quality Label

Relevant CBRN TCs in Europe (and later, as a result of a collaboration between eNOTICE and DG-DEVCO, worldwide) were identified in T2.1.1 and information on these TCs was collected using a questionnaire. This information forms the basis for the CBRN TC profiles presented in the ECC.

T2.1.2 used the information gathered in T2.1.1 to elaborate a search function and a capacity label, which allows users to quickly assess TC's capabilities. Both, the search function and the capacity label were integrated in the ECC.

1.3.2 Task 2.3 - Identification of barriers, levers, Key Performance Indicators and good practices for a CBRN network

In T2.3, conditions for a successful network and KPIs for establishing a successful network are identified. This includes the motivation of the target group of security stakeholders to become network members. The results of T2.3 were used to identify similar networks and networking websites and to build on their lessons learned.

1.3.3 Task 3.4 - Integration of platforms and interfaces

T3.4 identified, based on the results of T2.3, interesting platforms with goals that are identical, similar or complementary to the goals of the ECC. Links between those platforms and the ECC will be established and technical interfaces, which enable cross-platform interoperability, were implemented in the ECC.

1.3.4 Task 5.2.2 – Evaluation of the functioning of the web-based platform

After V1 of the ECC is completed, T5.2.2 will evaluate its functioning. Feedback from T5.2.2 will be used to continuously improve the ECC.

1.4 Approach

This section describes how the previously defined objectives will be met.

In the first step, the methodology used for the research process, for requirements gathering and for the software engineering will be described (Chapter 2). Based on this methodology, the requirements identified will be elaborated in Chapter 3.

In the next step, a short overview of related work regarding networking platforms will be presented (Chapter 4).

The networking platform solution for eNOTICE, based on the gathered requirements and the lessons learned from related work and implemented using the described software engineering methodology, will be introduced and elaborated in Chapter 5.

Chapter 6 presents a short evaluation with the main evaluation being conducted in T5.2.2.

In the last step, the results of this deliverable will be summarized and an outlook on future work will be given (Chapter 7).

2 Methodology

This chapter describes the methodology used during the development of the ECC for research, requirements gathering and implementation.

2.1 Research Methodology - Design Science

The ECC can be interpreted as an artefact which is designed according to the guidelines of Design Science Research, described in [Hevner et al. 2004] and explained in more detail in Section 2.1.2 of D3.15.

This deliverable is based on the three cycle model of Design Science Research, published by Hevner and Chatterjee in [Hevner and Chatterjee 2010] and shown in Figure 1. The first cycle is the Rigor Cycle, which grounds the developed artefact to the knowledge base (state of the art) and ensures that new knowledge gained during the design of the artefact is added back into the knowledge base. The second cycle, the Design Cycle, describes the actual design of the artefact. In the third and last cycle, the Relevancy Cycle, the relevancy of the developed artefact for its intended end-users is ensured.

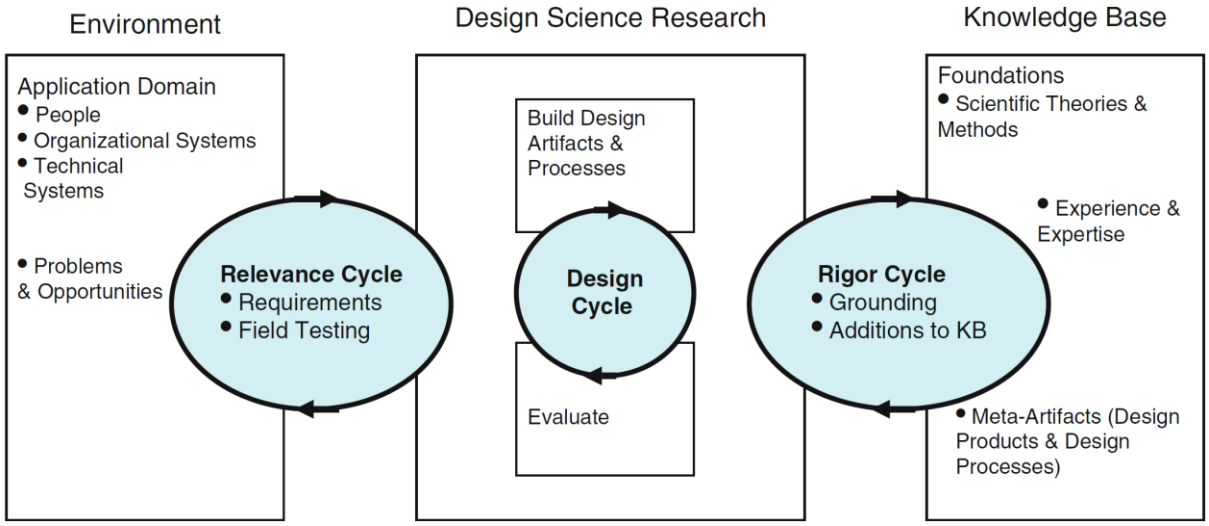


Figure 1: The three cycle model of Design Science (Source: [Hevner and Chatterjee 2010], p. 16)

2.2 Requirements Gathering

The process used to gather requirements for the ECC was already described in D3.6, therefore only a short summary will be presented in this deliverable.

Figure 2 visualizes this process. One source of requirements is the current state of the art, which contains lessons learned from previous projects (e.g. TEAMWORK, ToxiTriage and SecInCoRe), the eNOTICE Grant Agreement, a master thesis conducted at the University of Paderborn on requirements for a CBRN networking platform [Schultz 2018] and of course all available literature. Another source of requirements is direct feedback from end-users of the ECC, which includes the eNOTICE Grant Agreement and previously mentioned master thesis, as these were written with direct involvement of relevant end-users. Feedback and input from

end-users were also provided in the form of deliverables (e.g. all deliverables from WP2) and in workshops and feedback sessions conducted at the eNOTICE Joint Activities.

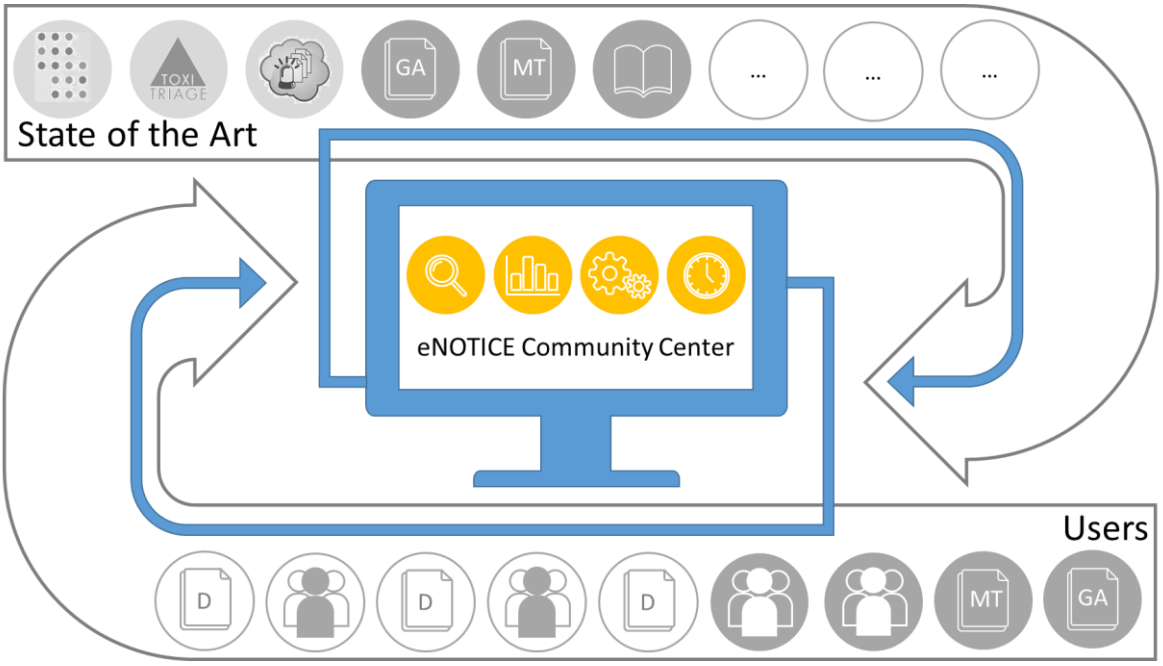


Figure 2: The requirements gathering process visualized (Source: D3.6)

As indicated by the blue arrows in Figure 2, loops feed back information on the ECC into the state of the art (in the form of publications) and towards end-users (using field testing and evaluation), thus completing the Rigor and Relevancy cycles of Design Science.

A consequence of this iterative and agile design approach is, that although some requirements were known when the development of the ECC started, the development was not structured in a strict "requirements engineering – development – evaluation" phase model. Requirements were constantly added, changed or removed and the end-users were continuously involved and provided feedback. This created challenges for the software engineering methodology, which will be elaborated in the following.

2.3 Software development

In order to implement the adaptive requirements gathering approach, an agile software development process[6] was used for the software engineering. This agile approach focuses on working software, collaboration with the end-users and accepting changes as part of the development process. In practice, this was implemented in a SCRUM-like process [Schwaber and Beedle 2002] to ensure that the requirements were actually met and the requested changes implemented in a timely fashion. The DevOps process [Bass et al. 2015] was used to test, deploy and operate changes to the software of the ECC as soon and often as possible, enabling short feedback cycles.

Altogether, the software development process forms the Design Cycle of Design Science.

[6] https://agilemanifesto.org/

3 Requirements

As described in Section 2.2, requirements were gathered in an iterative process. This chapter describes the different sources for requirements and provides a combined list of all identified relevant requirements.

3.1 Sources for Requirements

This section presents a brief overview of the sources for requirements.

3.1.1 Grant Agreement and other eNOTICE tasks

The eNOTICE Description of Action specifies several requirements which must be implemented by the ECC.

Task 3.2 defines e.g. that the ECC should implement a discussion forum, an event calendar and a search function for the roster. It also defines several requirements in a more abstract way, e.g. “enhanced sharing of information” and a permissions system.

Task 3.4 identifies other relevant networks and defines technical interfaces to be implemented in the ECC.

Tasks 5.2.2 and 5.2.4 evaluate the functioning of the ECC and the search function for CBRN TC. The tasks require input on the number of visitors and usage of different tools in the ECC.

3.1.2 Master thesis survey

UPB commissioned a master thesis to identify requirements and expectations of the eNOTICE partners [Schultz 2018]. The thesis used a survey, which was distributed to the consortium, to not only identify requirements but to also learn about existing experience with collaboration platforms, to give the partners an opportunity to rate the importance of given features and to express their opinions and preferences. The survey yielded several important insights, e.g. that partners would like to have the option to subscribe to updates via emails so that they don’t have to constantly check the ECC for news or that exchange with other stakeholders is extremely important.

The complete results of the survey can be found in Annex 1 of D3.6.

3.1.3 Gurcy workshop

The Joint Activity in Gurcy, France in 2017 was used to conduct a requirements gathering workshop with the workshop methodology described in D3.6. The 13 participants collaboratively developed ideas on topics such as communication tools and means for sharing expertise and best practices.

The results of this workshop are summarized in Annex 2 of D3.6.

3.1.4 Usage scenarios described in D3.6

The usage scenarios described in Chapter 3 of D3.6 were used as the basis for ongoing discussions at Joint Activities. Some described features were identified as not relevant (e.g. voice communication during Joint Activities), while others, such as the ability to collect photos from every participant after a JA were used extensively.

3.1.5 Ongoing involvement and feedback of end users at Joint Activities

Every Joint Activity was used to present the ongoing work on the ECC, to address open questions and to collect feedback from the participants. The participants included both the eNOTICE consortium members at consortium meetings and external experts using the feedback forms of WP4.

The direct feedback during JAs has proven to be a valuable source of requirements as issues could be addressed quickly and without unnecessary overhead for clarification via mail. It also helped gather insights into how the end users understand and use the provided tools.

3.1.6 Others

Other sources for requirements are the lessons learned of related work described in Chapter 4 and experiences from previous projects such as SecInCoRe[7] and TEAMWORK[8]. This experience was used to identify ideas which usually work well or not so well in use cases similar or identical to eNOTICE.

3.2 List of identified requirements

All identified relevant high-level requirements are listed in the table below. To embed them into the broader context of eNOTICE, the requirements are connected to the three lines of action, which are as follows:

- L1: Roster of capabilities and facilities
- L2: Opportunities to share expertise
- L3: Plan to pool and optimize resources

No.	Feature	Description	L1	L2	L3
1	Roster (Catalogue)	Information of training centers and their capabilities, information of Joint Activities	X		X
2	Profile of organizations	Information about the type, location, thematic areas and more	X		X
3	Profile of members	Contact details, name, organization		X	
4	Means for sharing expertise and documents	Concentrating information, collecting users´ knowledge		X	X
5	Calendar	Is visible to everyone, supports the organization of activities and events		X	X
6	User groups	Join with arbitrary members, information is only visible in the group		X	
7	Search function	Searching all accessible areas	X	X	X

[7] http://www.secincore.eu/
[8] https://www.teamworkprojekt.de/

8	Rights system	Describes the privileges of a member			
9	Multiple languages	Post and information in several languages			
10	Monitoring platform activities	Feature to measure the activity on the platform			
11	Integration of other platforms	Links to other platforms, information of other projects		X	X
12	Live web communication	Live information exchange and communication		X	
13	Question and Answer system	Questions that are visible to everyone, experts can answer the questions		X	
14	Subscriptions	Subscribe to email notifications		X	
15	E-Learning courses	Train users and share information and knowledge		X	X
16	Chat	Asynchronous communication		X	
17	Registration	Available for everyone, but restriction in the beginning			
18	Forum	Discuss topics with several participants over an extended time period		X	X
19	Document sharing	Upload and share documents and photos		X	
20	Mapping and gap analysis	Provide the results of the stakeholders mapping and gap analysis		X	X
21	Common language	Common vocabulary for technical terms		X	X
22	Sustainable	Cost-effective and low maintenance			

4 Related work

In this chapter, software, websites and projects relevant for the design of the ECC are presented. The architecture of the ECC will be based on the lessons learned and best practices determined in this chapter.

4.1 Elgg

Elgg is a „ powerful open source social networking engine"[9] and powers e.g. the CMT[10], which is used by many networking projects (e.g. SAYSO) as a networking platform. Elgg offers strong social networking aspects, giving users the option to create open or closed groups, post in blogs, share files and organize using a shared calendar. A variety of plugins for profile management, collaboration aspects such as video conferencing and different themes are available for download.

Although Elgg fulfills some of the defined requirements, it offers only loose integration between components and does not provide a seamless user experience (UX) as many features are implemented via plugins. Nevertheless, it might provide a good foundation for the ECC.

4.2 Nextcloud and Collabora

Nextcloud[11] can be understood as an open-source and self-hosted Dropbox clone. It provides file synchronization and sharing capabilities in the browser and via native desktop and mobile apps. Plugins such as Talk enable virtual meeting capabilities and offer group video and audio calls with screen sharing. In combination with Collabora Online[12], Nextcloud integrates an online editor for Office files, which can be used for real-time collaborative editing in the web browser. The plugin Social adds social networking features like posts, timelines and friends to Nextcloud, but is currently in an alpha state and not yet stable.

Nextcloud provides many collaboration features but little customizability and no facility for permanent discussions (like a forum). It could therefore be used as a building block for the ECC, but only in combination with other software providing the missing functionality.

4.3 diaspora*

Diaspora[13] and similar software such as Mastodon[14] or Friendica[15] provide decentralized social networking features such as friend lists, timelines with posts, closed groups, media sharing, user profiles and shared calendars. Due to the decentralized design, this software, also known as the "fediverse", provides a high degree of data protection and autonomy. However, the fediverse software only provides social networking features and no collaboration tools or

[9] From: https://elgg.org/
[10] https://cmt.eurtd.com/
[11] https://nextcloud.com/
[12] https://www.collaboraoffice.com/code/
[13] https://diasporafoundation.org/
[14] https://mastodon.social/about
[15] https://friendi.ca/

customizable components. Nevertheless, the federated approach to social networking using open protocols might be used in eNOTICE to connect the users in the ECC with other networking projects (see D3.15, ActivityPub).

4.4 Moodle

Moodle[16] is a content management system primarily used for eLearning. It provides basic networking features like a chat, closed groups (courses), a forum and personal blogs. Additional functionality, like the ability to host a public website or to integrate with other systems such as Nextcloud is available via plugins. A project connecting Moodle to the fediverse and adding more social features, called MoodleNet[17] is currently under development and in an alpha stage.

Although Moodle is a highly customizable system, it does not provide advanced collaboration or sharing capabilities. It might therefore be used to build the ECC in combination with a tool which provides strong collaboration capabilities, such as Nextcloud.

4.5 Citadel

Citadel[18] is a collaboration solution and includes functions for messaging, shared calendars, forums, instant messages, wikis and blogs. Every feature is organized in “rooms” to which access can be restricted. In the case of eNOTICE, each TC could have an own room with an internal forum and knowledge management (wiki).

Unfortunately, Citadel does not provide a modern looking user interface and might as such not be easily usable. However, certain concepts such as the rooms could be useful for eNOTICE.

4.6 CIRCABC

CIRCABC[19] is a collaborative solution developed by the European Commission services for exchange of information in EU projects. It contains the features for shared calendar of events, documents storage and exchange, a discussion forum. Membership is based upon invitations and requires ECAS login. eNOTICE currently participates in the “meta-collaborative” space dedicated to the Networks of Practitioners. The solution is yet in the testing mode, is run and maintained by the EC. It could be a valuable source of information for collaboration in the future, provided that the data is made available freely and in a standardized format.

4.7 Conclusion

Although only a small portion of the large amount of available social networking projects were presented, these projects can be seen as representative as they either have a large number of

[16] https://moodle.org/
[17] https://blog.moodle.net/
[18] http://www.citadel.org/
[19] https://circabc.europa.eu/faces/jsp/extension/wai/login.jsp

users or provide unique features. No single software meets all defined requirements, therefore a new architecture, using multiple software and ideas presented in this chapter, must be defined and implemented.

5 Solution and Implementation

In this chapter, the architecture and implementation of the ECC are presented.

5.1 Conceptual architecture

The conceptual architecture of the ECC is depicted in Figure 3. In the following, the basic concepts and relationships will be elaborated.

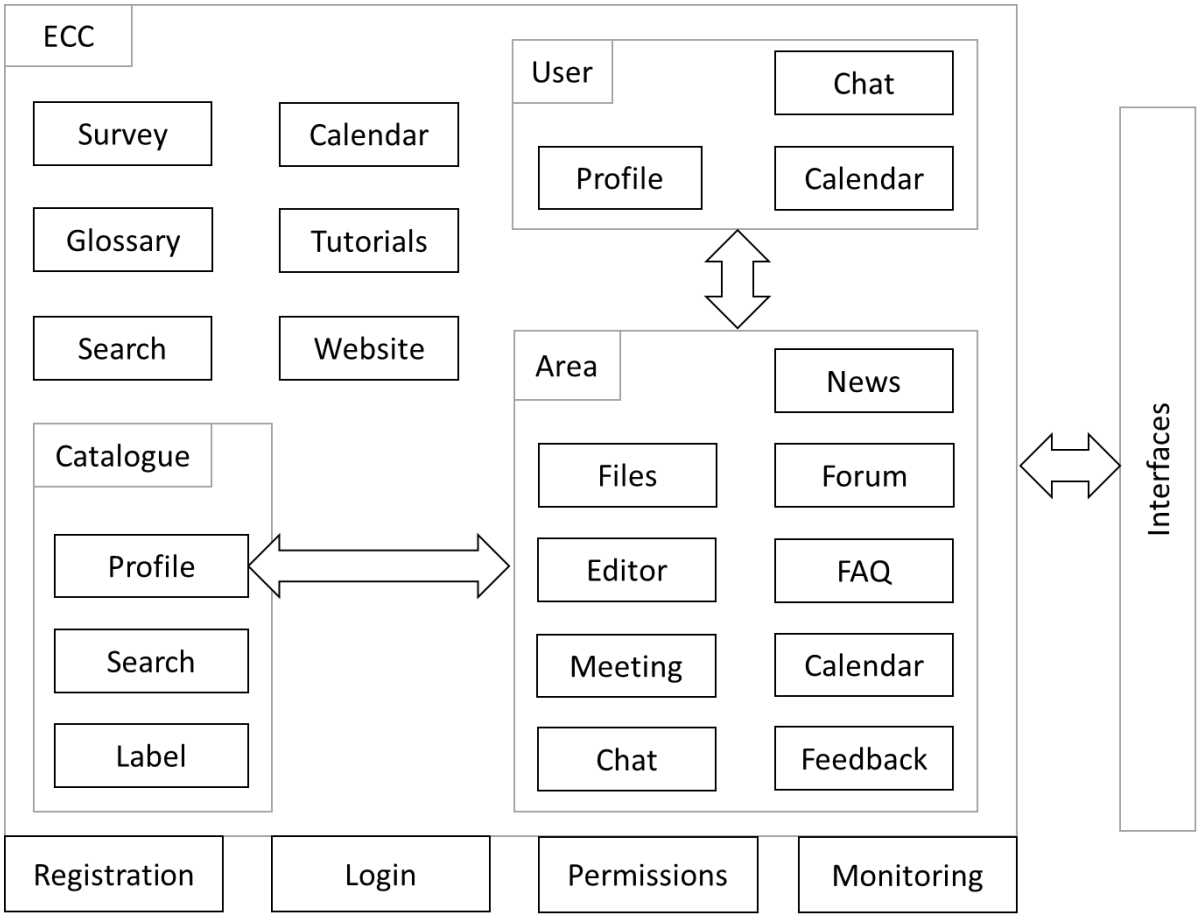


Figure 3: The conceptual architecture of the ECC

5.1.1 Users

As eNOTICE is a networking project, users are an essential part of the ECC. Each user has a profile which is accessible to other registered users and contains not only basic information such as the name and location but also contact details, information on the organization and role within the organization of the user and a list of CBRN-related interests. Apart from the very basic information (name), users can freely decide which information they want to provide and share with others.

Each user has a personal calendar which can be used to maintain a list of personal events. This calendar is private to each specific user and cannot be shared with others. It can however be exported e.g. to Outlook or Thunderbird so that it is available in each user's familiar tools and not only in the ECC.

The chat function can be used to chat privately with other users or groups of users. It is envisaged as a synchronous communication tool used to e.g. answer small questions or quickly exchange ideas. Users can opt out of using the chat if they do not want to use it or subscribe to email notifications on new messages so that they do not have to constantly monitor the chat on the ECC.

5.1.2 Areas

Areas are the ECC's adoption of the "rooms" concept used in Citadel. They provide a dedicated space with tools shared by some users. An area can either be open to every user (e.g. a generic area used to discuss radiological detectors) or closed and only accessible to invited users (e.g. an internal area used by the staff of a training center). One example of a public area is the "General Area". This area is shared among all users of the ECC and can be used for side-wide announcements or general discussions regarding eNOTICE.

Each area contains a news section which can be used by the owner of the area to share important news with all members, a forum for discussions and an FAQ section to avoid duplicate questions in the forum. Furthermore, a dedicated calendar can be used to maintain dates which are relevant for all area members (e.g. dates of exercises or important dissemination events) and a chat is available for quick communication. If the users of an area want to contact the owners but do not know how to reach them, they might use the feedback form to do so.

The virtual meeting room provides further possibilities for collaboration. It can be used by groups of users and features a video- and audio-chat as well as screen sharing capabilities. This virtual meeting room, which is similar to GoToMeeting or Webex, is available for free to all registered users without installing any additional software, only a modern web browser is required.

The file sharing and editor tools can be used to edit Office documents collaboratively in real-time in the browser. This allows the members of an area to e.g. maintain a shared version of an Excel file without the problems associated with sending the file back-and-forth via email.

5.1.3 Catalogues

Two public catalogues are maintained on the platform: One for training centers and one for joint activities. Both catalogues provide a similar set of functions for their respective content.

The user can use a search function to find a TC or JA most suitable to one's needs. This includes the geographic location, thematic areas, facilities (for TCs) and dates (for JAs). The capacity label (as defined in D2.2) can provide a quick overview of relevant capabilities.

Once the user has found a suitable TC or JA, the profile can be used to gather more information. It contains a description, photos, details on accessibility, lodging, accommodations and contact details. If a TC has both a profile in the catalogue and a dedicated area in the ECC, the profile page can refer to the area and vice versa.

5.1.4 Side-wide tools

Some tools are available in the ECC independent of specific users or areas. Only the most relevant of them will be described in the following.

As English is a second language for most users of the ECC, a glossary helps avoid misunderstandings and different usages of technical terms. The CBRN-related terms in the glossary were imported from the European CBRNE Glossary by JRC[20]. Glossary entries are linked automatically e.g. in the forum, so users do not have to visit the glossary to look up terms.

To guide new users which are not familiar with the ECC, tutorials in the form of walkthroughs appear when the user logs in for the first time.

The public website is also integrated into the ECC. It provides general information on the eNOTICE project and consortium, contact details, links to the social media profiles, a list of publications and deliverables and legally required information such as a legal notice and a GDPR-compliant privacy policy.

5.1.5 Supporting tools

Usage of the ECC is supported by the registration and login system SafetyID. This system allows coherent user accounts and groups across different technical systems, as described in Section 5.2. As a result, users need to remember just one set of credentials and do not have to re-authenticate when switching tools. Further mechanisms such as two-factor authentication can be enabled in the future to further improve the security of the login process.

The analytics tool Matomo monitors the usage of the ECC in a GDRP-compliant fashion. Statistics on the usage of certain tools and pages are required for the semestrial reports on the use of the ECC (D3.10-D3.14) and the evaluation conducted in WP5. Further information on the monitoring tool is available in D5.3 and D5.6.

5.1.6 Interfaces

Whenever possible, open interfaces and protocols have been used to provide interoperability with third party tools and avoid vendor lock-in. The technical details of these interfaces will be elaborated in the context of Task 3.4 (Integration of platforms and interfaces) and are preliminary described in D3.15.

5.2 Architecture implementation

The technical implementation of the concept presented in the previous section will be explained in the following. As shown in Figure 4, the main components are a Moodle and a Nextcloud software installation, which are connected to various data sources. The details of each component will be presented in the following sections.

[20] http://opencbrne.jrc.ec.europa.eu/main

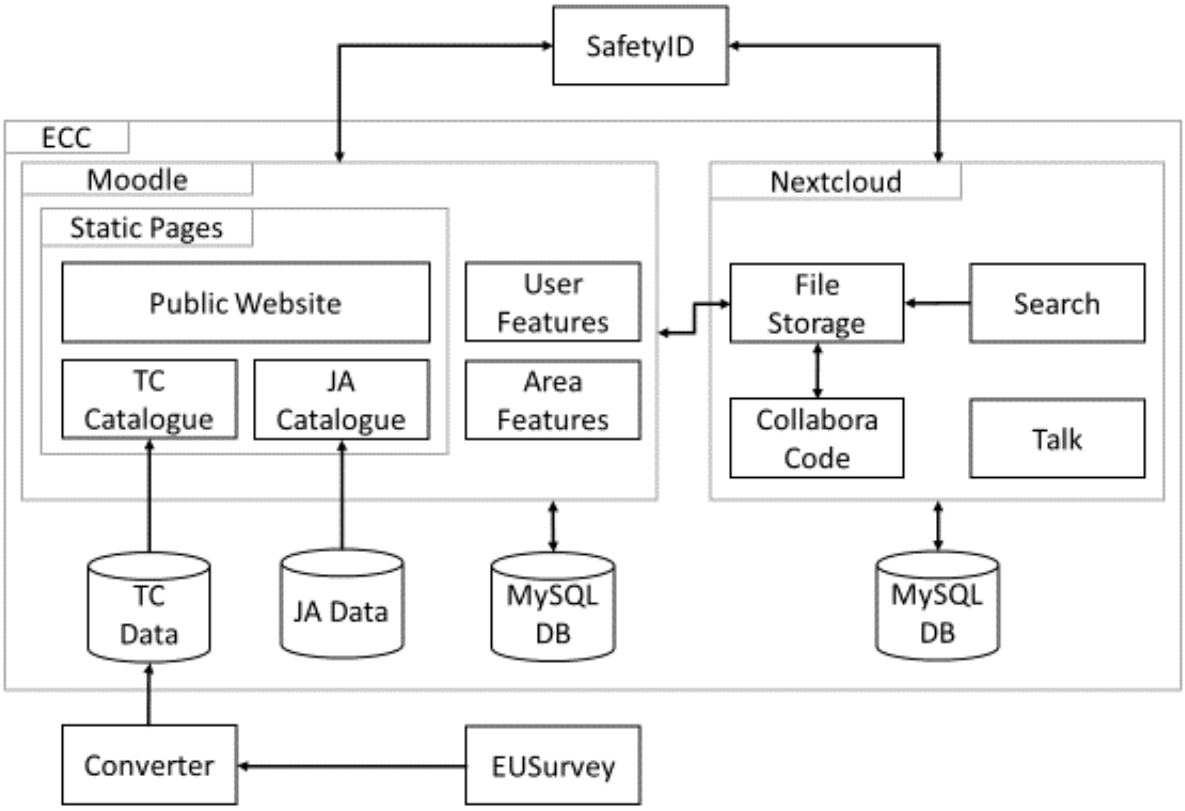


Figure 4: The technical architecture of the ECC

5.2.1 Moodle

Moodle is used as the base content management system, as it provides much of the required functionality out-of-the-box. Additionally, as Moodle is originally a learning management system and the members of the eNOTICE network are education facilities, they might already be familiar with Moodle[21]. This will make usage of the ECC easier for end-users and provides possibilities for integration between the TC's systems and the ECC in the future.

A large part of the user- and area-specific features and side-wide tools (e.g. chats, glossary, forum) is provided by Moodle but was modified to appear in a coherent fashion and not in the typical Moodle-like course format.

5.2.2 Static Pages

The features, which were not directly supported by Moodle were manually implemented using the Static Pages[22] Moodle plugin. This plugin provides the possibility to create completely custom pages within Moodle using own source code written in HTML, CSS and JavaScript.

[21] Moodle is e.g. used by the eNOTICE partner Joint CBRN Defence Centre of Excellence, see here: https://www.jcbrncoe.cz/tp/
[22] https://moodle.org/plugins/local_staticpage

Initially, the static pages were just used to implement the public website described in D3.4 and D3.5. Additionally, the customizability of the static pages has proven to be an efficient tool for implementing the TC and JA catalogues.

5.2.3 Catalogues

New eNOTICE TC network members fill out a survey on their capacities and capabilities in the EUSurvey tool (see D2.1). Survey data is then exported as an XML file and converted into a suitable JSON file for the TC catalogue web application.

This web application is implemented using HTML, CSS, JavaScript and Bootstrap to display an overview of the TCs in the catalogue and individual profile pages. In cases where maps are required, the Leaflet.js library is used to display information on an OpenStreetMap layer.

The JA catalogue works analogously, but data on the Joint Activities is entered directly into a JSON file as no frequent updates via an UI are required.

5.2.4 Nextcloud

Functionality which is not provided either by Moodle or via custom web apps is implemented in Nextcloud with the help of various plugins.

The core filesharing functionality of Nextcloud is extended using the Collabora CODE[23] office suite for real-time collaborative document editing. The free CODE edition of Collabora was selected despite being branded as a "development version", as the productive Collabora Online versions cost 17€/user/year. The free CODE version seems to provide all the required features, although it does not come with a support contract and needs to be administrated manually.

A comprehensive full-text search on all files stored in the Nextcloud is provided by Elasticsearch. The Elasticsearch server periodically indexes all common file types (office documents, PDFs, …) stored in Nextcloud. In the future, the Tesseract OCR app[24] could be used to also index text on photos or scanned documents.

The Talk plugin[25] implements the virtual meeting room functionality. Although all functionality of this plugin is available in the browser using the WebRTC technology, apps for Android[26] and iOS[27] are also available.

Both Nextcloud and Moodle use MySQL as their backend database system and SafetyID as their login system.

[23] https://www.collaboraoffice.com/code/
[24] https://apps.nextcloud.com/apps/files_fulltextsearch_tesseract
[25] https://apps.nextcloud.com/apps/spreed
[26] https://play.google.com/store/apps/details?id=com.nextcloud.talk2
[27] https://apps.apple.com/us/app/nextcloud-talk/id1296825574

5.3 User Interface

In this section, the details of the user interface of the ECC will be shown and explained. Note that the information contained in the screenshots is mostly dummy data, as the ECC will only be open for public registration at the end of August 2019.

5.3.1 Landing Page

Figure 5 displays the very first page any user sees when accessing the eNOTICE public website. This page was designed so that all important information on eNOTICE is available in one place.

The first row provides information on the eNOTICE project itself. Apart from the general project and consortium description, a button for registration on the ECC is prominently displayed. This button is currently greyed out but will be activated at the end of August 2019.

All important benefits for any visitor of the website (without an account) are highlighted in the second row. It provides access to the Training Center and Joint Activities catalogues as well as a list of publications by eNOTICE. The publications include public deliverables, press releases and scientific papers.

In contrast to the first two rows, which contain static links, the third row is generated dynamically to always provide up-to-date information on the landing page. The information consists of a brief summary of the last and next Joint Activity and of the embedded eNOTICE Twitter feed. In the future, the “Last Joint Activity” section might be replaced and used e.g. to promote a random (or the newest) TC member of the eNOTICE network.

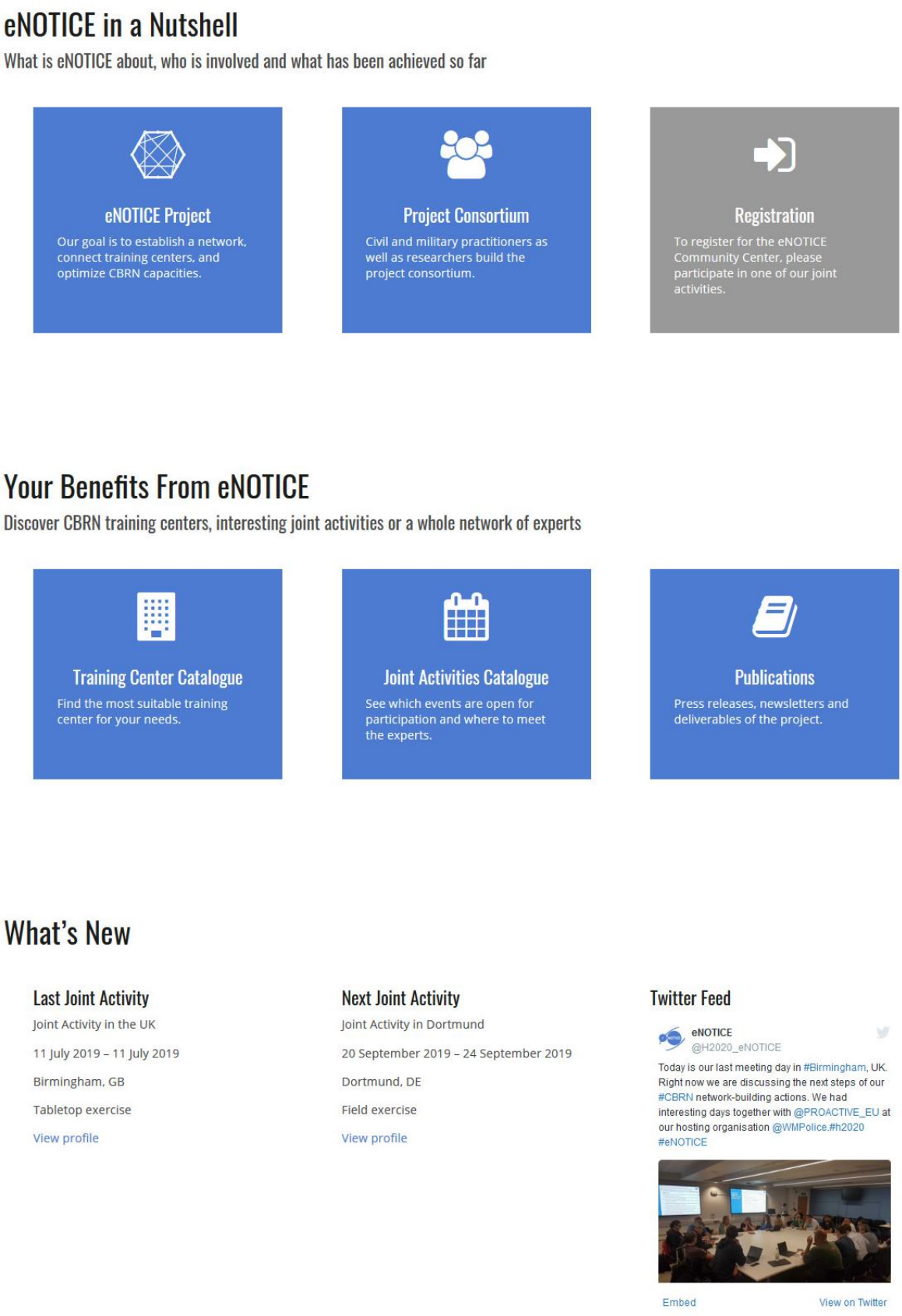


Figure 5: The public website landing page

5.3.2 Footer

The footer shown in Figure 6 is located at the bottom of every page in the ECC. Apart from the general links displayed on the landing page, it also provides contact information via social media and email. Additionally, the footer contains links to legally required documents and identifies eNOTICE as a project sponsored by the European Union's H2020 program.

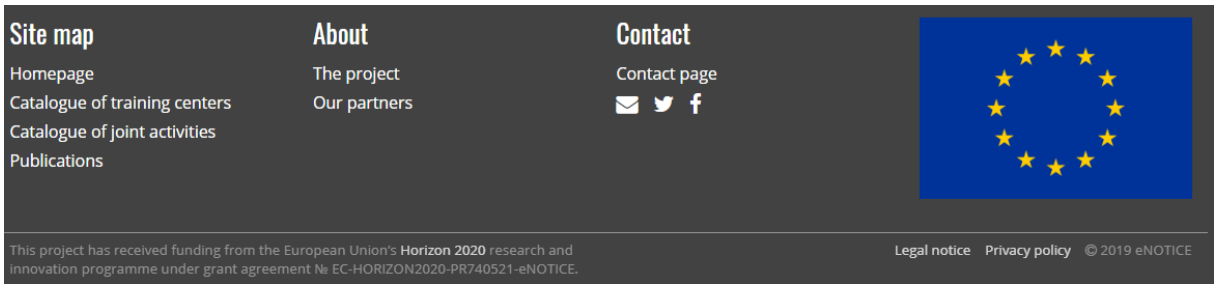


Figure 6: The footer shown below every page

5.3.3 CBRN TC Catalogue

Figure 7 shows the overview page of the CBRN TC catalogue.

If the user knows exactly what TC they are looking for, they can use the "Search by name" function to quickly access the profile of a specific TC. In case the user wants to identify a TC based on a set of criteria, the extended search function based on capabilities and capacities might be used. This function allows filtering the TC list by country, thematic expertise (which CBRNe field the TC focuses on), professional expertise (the main target group of the TC, e.g. firefighters), accessibility (by which means of transportation the TC can be accessed), details of the training area (e.g. size) and accommodations (e.g. availability of on-site dining and WiFi). The selected filters are combined using AND-logic, meaning that only TCs matching all the selected criteria will be displayed in the results view below.

The list results view provides a quick overview of the name, expertise, location and accessibility of each TC. Clicking on a specific TC refers the user to the TC's profile page. In the future, the list view could be extended to also include information from the capacity label.

As shown in Figure 8, an alternative map view of the results is also available. This view shows only the name and location of each TC but provides a link to the TC profile where more details are available.

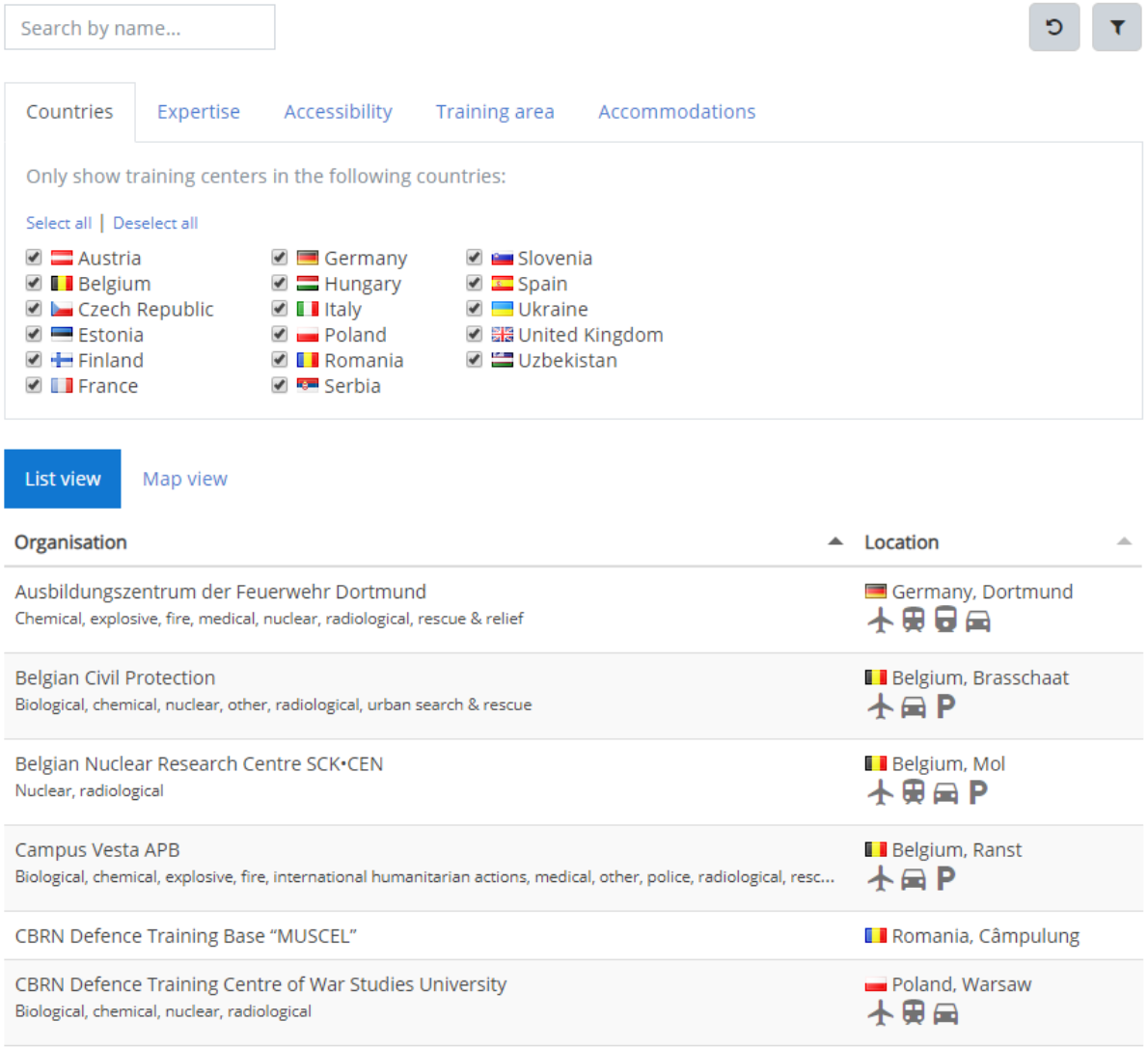


Figure 7: The overview page of the TC catalogue in list view

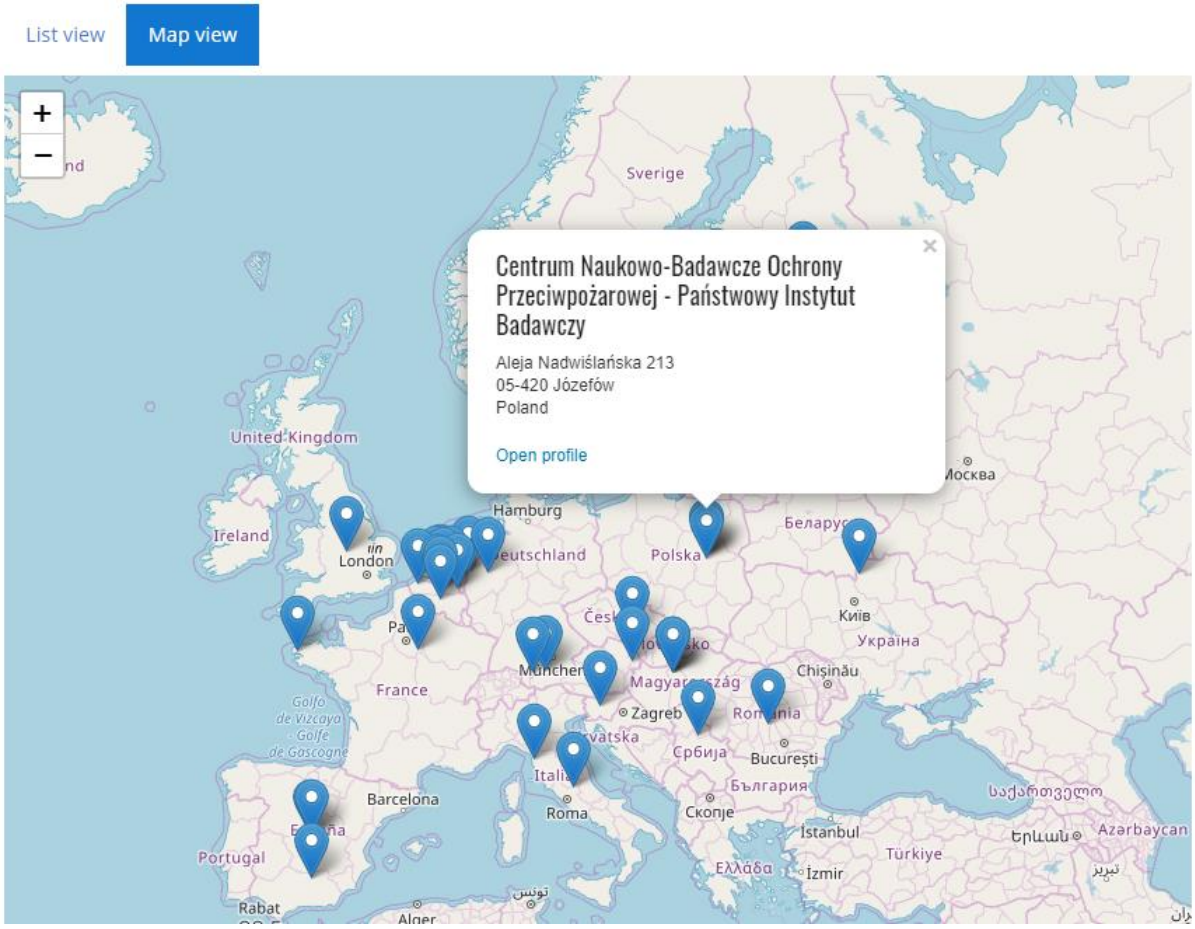


Figure 8: The map results view of the TC catalogue

5.3.4 TC Profile

An example CBRN TC profile is shown in Figure 9. Each profile starts with the most important information: The name and location of the TC, the website and contact email address and a short textual description.

Important characteristics of the center are displayed in a table. The currently displayed information could be extended in the future using other information available from the CBRN TC questionnaire.

The presented profile also shows a beta version of the CBRN TC capacity label as described in D2.2. This label can be used to easily assess a TC's expertise in different fields and its hosting capacity.

Below the capacity label, the Joint Activities hosted by the TC are listed and linked. In the future, the basic list could be extended to include more information on the JA, such as the date or thematic focus.

At the very bottom of the profile page, the detailed address and location (screenshot cut off) are displayed. Furthermore, a link to Google Maps opens a direct Google Maps navigation so that the driving distance to the TC can be calculated. In future versions, an approximate distance could be displayed directly on the profile page.

Seine-et-Marne District Fire and Rescue Department SDIS 77

Gurcy-le-Châtel, France Website Email

About the center

The Seine-et-Marne district Fire and Rescue Department is a public agency in charge of firefighting missions. The department also carries out various rescue missions with other agencies. Due to the wide range of different environments and economic activities within its area of responsibility, the fire and rescue department hosts many specialized units (urban search and rescue, divers, HAZMAT teams, etc.). A network of 61 fire stations enables the department to respond quickly on all its area. The Fire and Rescue department is endowed with an annual budget of €170,000,000. The 1300 professional and 3000 volunteer firefighters carry out more than 110,000 rescue missions each year. The training centre is in charge of the training of all firefighters (professional or volunteers) as well as administration and support personnel. It also provide CBRN training for its own specialized units and other multidisciplinary agencies.

Characteristics

Thematic areas	Biological, chemical, fire, medical, nuclear, radiological, rescue & relief, urban search & rescue
Available area	80000 m², coherent
Accessible by	Plane, train, high-speed train, car
On-site parking	Available
Accommodations	Wi-Fi, gym, on-site dining, computer lounge, recreation room
Lodging	On-site and off-site, 130 persons

Capacity Labels

Eligibility

Field training capacity

Hosting capacity

Experience in EU projects

2

Joint Activities

This training center has hosted the following joint activities:

- Basic Training for Firefighters
- Joint Activity in Gurcy

Location

2, Rue Ampère, 77850 Gurcy-le-Châtel, France Open on Google Maps

Figure 9: The CBRN TC profile for eNOTICE partner SDIS77

5.3.5 JA Catalogue

Initially, the JAs were displayed on a simple static page similar to the partners list. This simple page was later changed to the catalogue shown in Figure 10, which is based on the TC catalogue. The similarities in the designs make it easier for users to use one of the catalogues if they already have experience with the other one.

In addition to the features of the TC catalogue, the JA catalogue also provides filters based on the timeframe of each Joint Activity. Joint Activities in the past are hidden by default, as they are generally less relevant for users than the upcoming activities. The small letters W and P indicate whether a JA is connected to an annual workshop or a policy meeting.

Clicking on one of the results refers the user to the JA profile page.

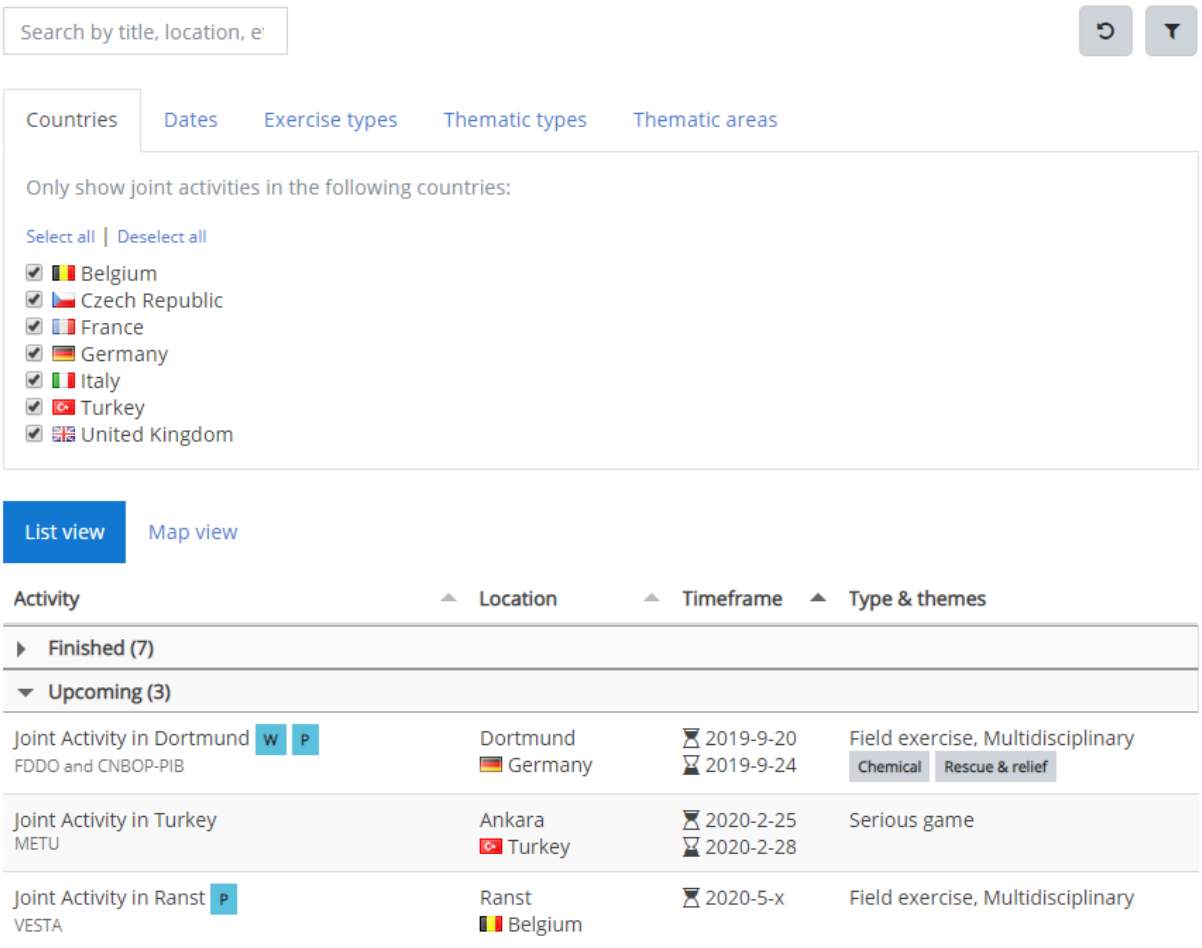


Figure 10: The JA catalogue page

5.3.6 JA Profile

Figure 11 shows the profile page for the JA hosted by eNOTICE partner WMP in July 2019. In addition to the most important details such as a short description, timeframe, location and thematic type and focus, the profile page also links directly to the profile page of the TC hosting the JA.

After a JA has concluded, the status automatically changes to “concluded”, the profile page is displayed in past tense (e.g. “was organized”) and the JA is no longer listed under “Upcoming” on the catalogue page.

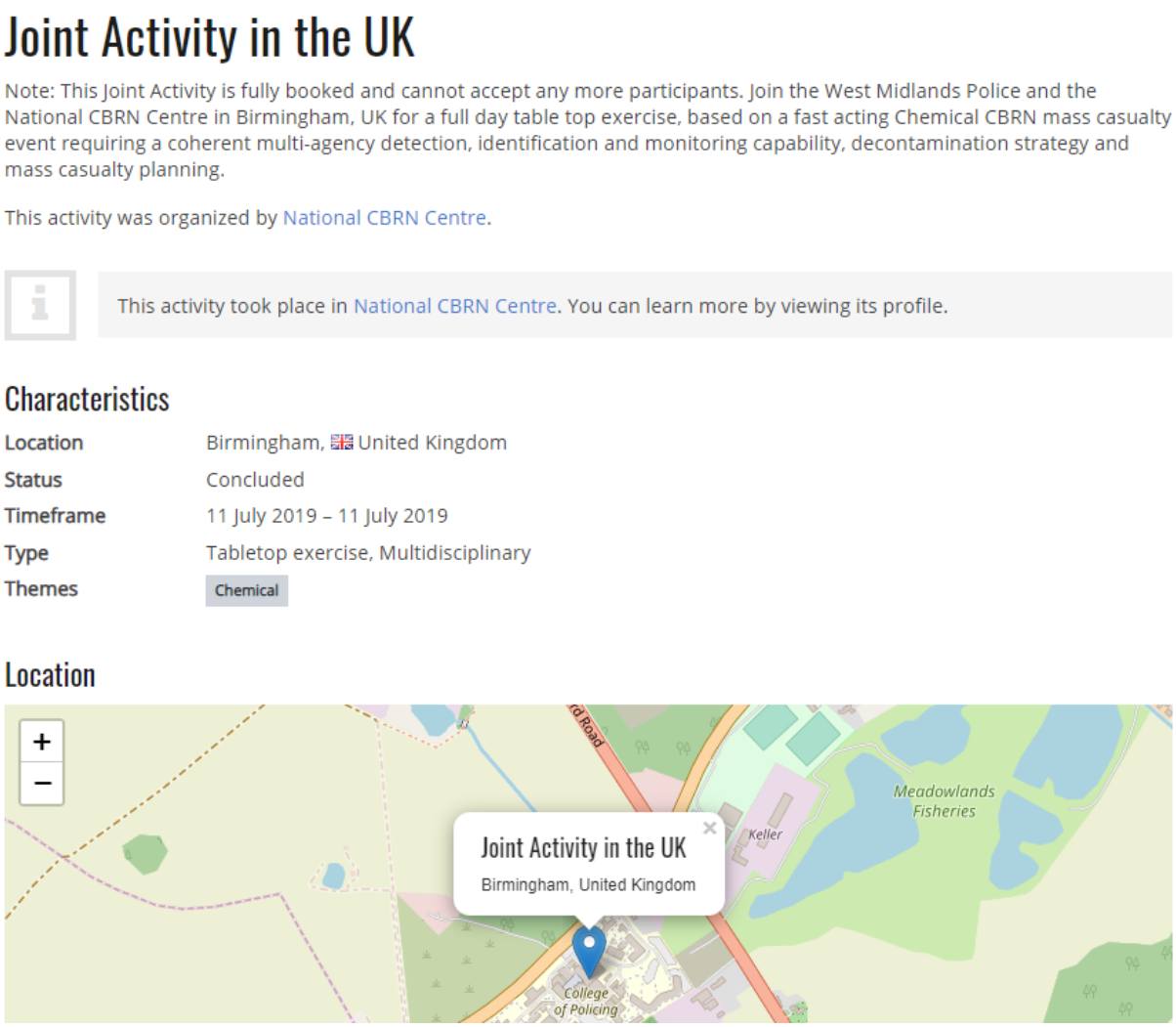


Figure 11: The profile of the JA hosted by WMP

5.3.7 Dashboard

All previously presented features are publicly accessible, the succeeding features are only accessible with an ECC account.

The first page a user sees after they log in is the Dashboard, is shown in Figure 12. The dashboard acts as an information hub and aggregates information on the calendar, upcoming events and public news. It also displays the currently and recently online users. Users can opt out of appearing in this list for privacy reasons.

By clicking the “General Area” button, the user is redirected to the general area, of which every ECC user is a member and which can be used to interact with the whole community.

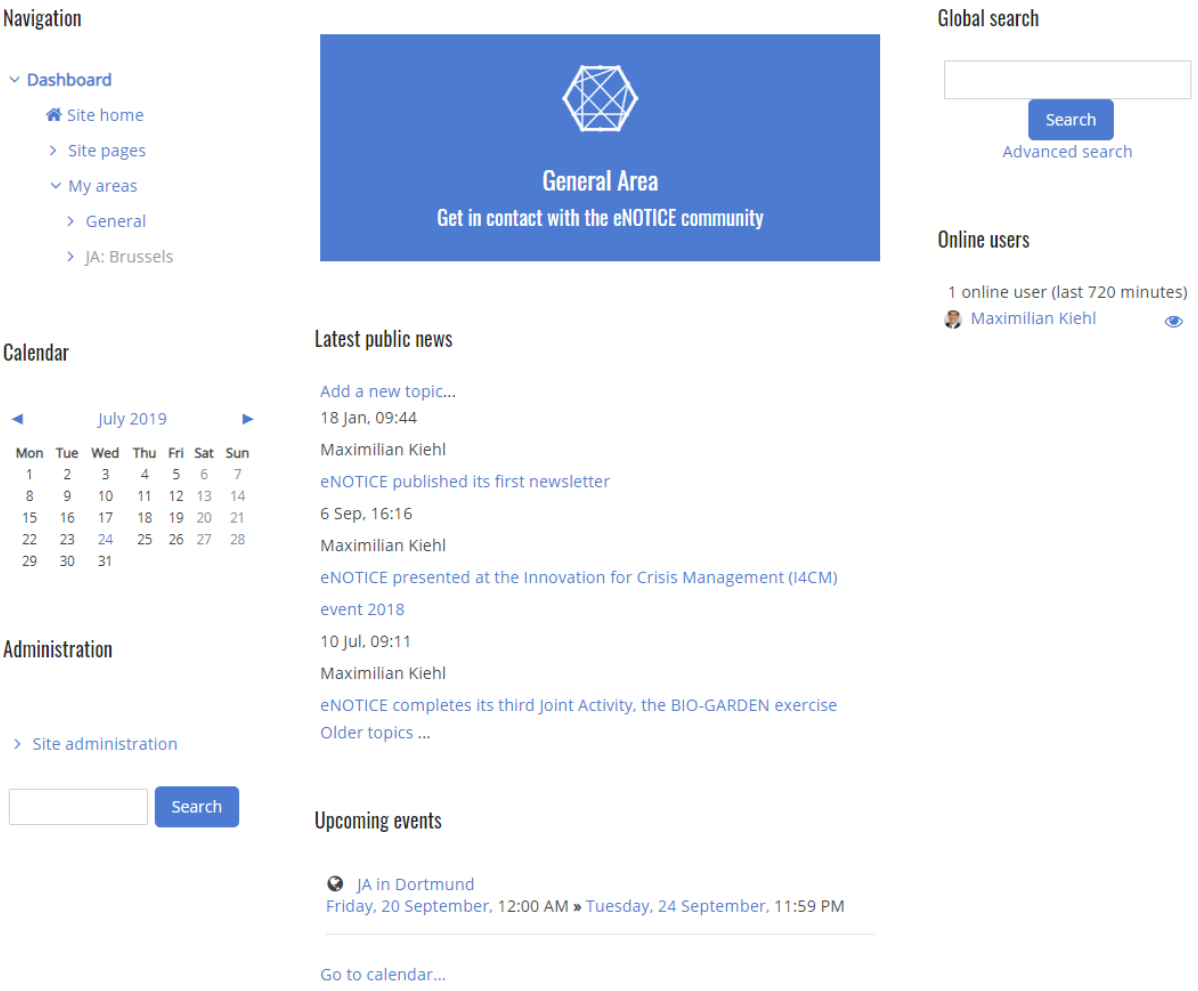


Figure 12: The first page displayed after a user logs in

5.3.8 General Area Overview

Figure 13 shows the main menu page displayed when accessing the General Area. This menu provides links to all important features implemented with Moodle and the ECC Cloud. ECC Cloud is the brand name given to the Nextcloud instance, so that it is distinguishable from the rest of the ECC, which uses Moodle.

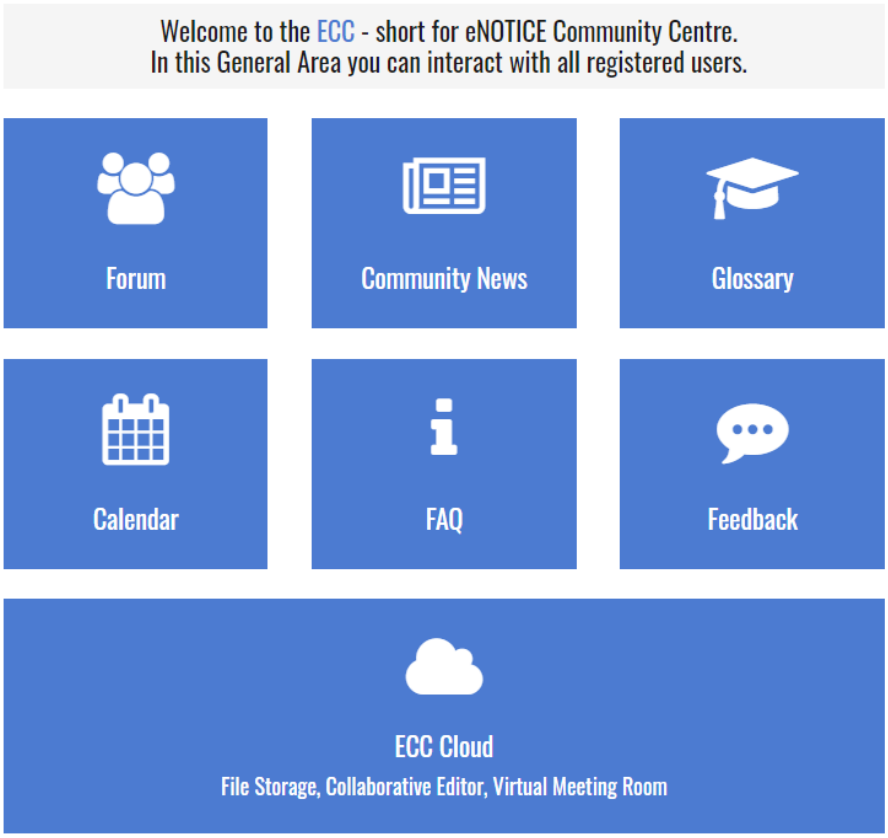


Figure 13: The overview menu of the General Area

5.3.9 Tutorials

An important part of onboarding new users to the ECC is the inclusion of interactive tutorials. These tutorials, as shown in Figure 14, guide the user visually along the elements of each page. The tutorial highlights and explains each feature individually, with users controlling the speed of the tutorial by clicking the “Next” or “Previous” buttons. Using the “End tour” button, the tutorial can be exited at any point. Of course the tutorial can be restarted later if the user wants to re-familiarize themselves with the presented features.

Currently, tutorials are available for the Dashboard and the General Area. More tutorials will be added as needed based on user feedback.

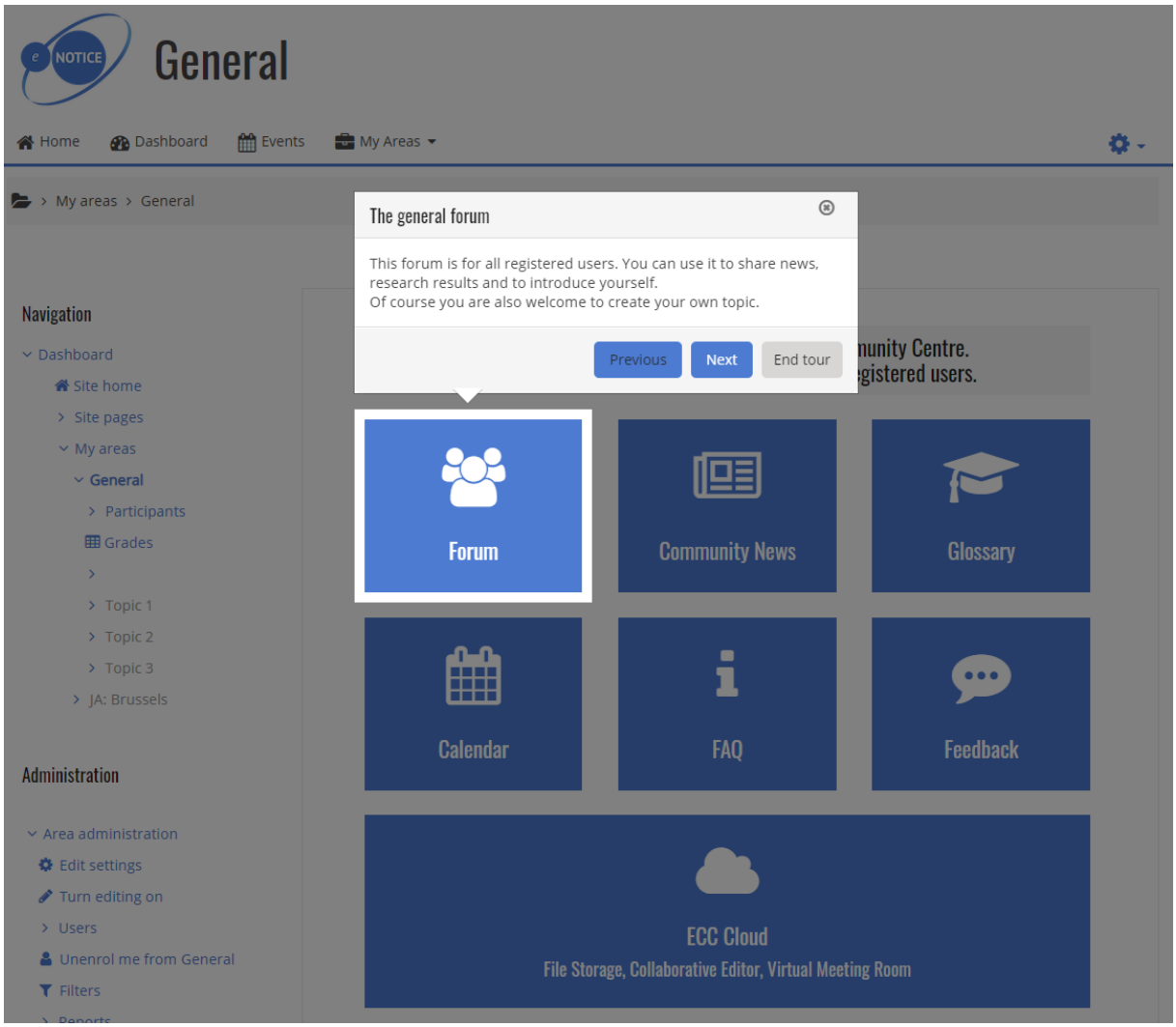


Figure 14: An interactive tutorial explaining the features of the General Area

5.3.10 User Profiles

Figure 15 displays all information available on user profiles. Only some information is required (username, first- and surname and email address) but a bulk of additional data such as the location and time zone, a short description of the interests, additional contact details and a profile photo can be added.

Specific interests (such as biological threats) can be indicated using pre-defined tags. Adding this information makes it available via the search function and allows users to find other users with similar or complimentary interests. This feature could be used to find an expert in a specific field for consultancy.

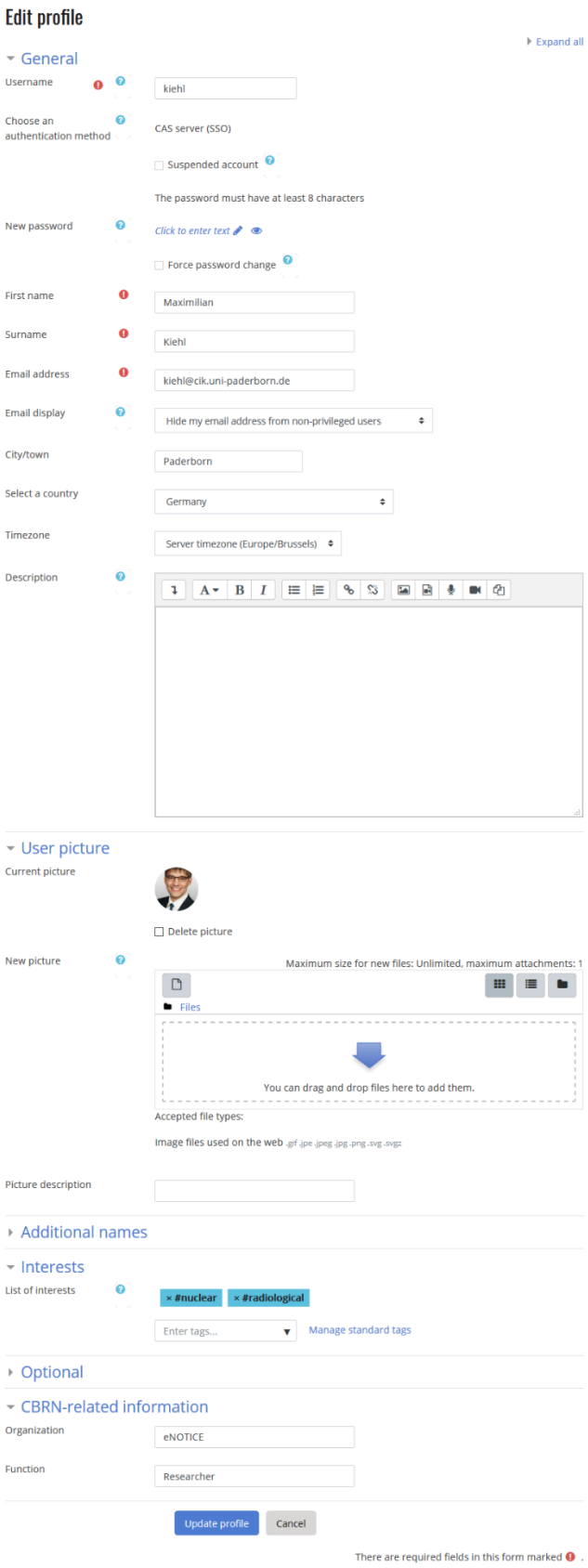


Figure 15: Editing a user's profile, including CBRN-specific information

5.3.11 Forum

The thread overview of the forum is shown in Figure 16. This overview shows all ongoing discussions together with their author, number of replies and last post.

When clicking on a specific discussion, the view shown in Figure 17 is displayed. This view is similar to conventional forums, but it allows for thread discussions. Users can not only reply to the specific topic but also to individual posts. This creates different threads within one discussion topic, reducing the confusion in complex discussions by making it clear to which post an answer is referencing.

Users can also choose to be notified via email when one of their posts or discussion topics receives a reply.

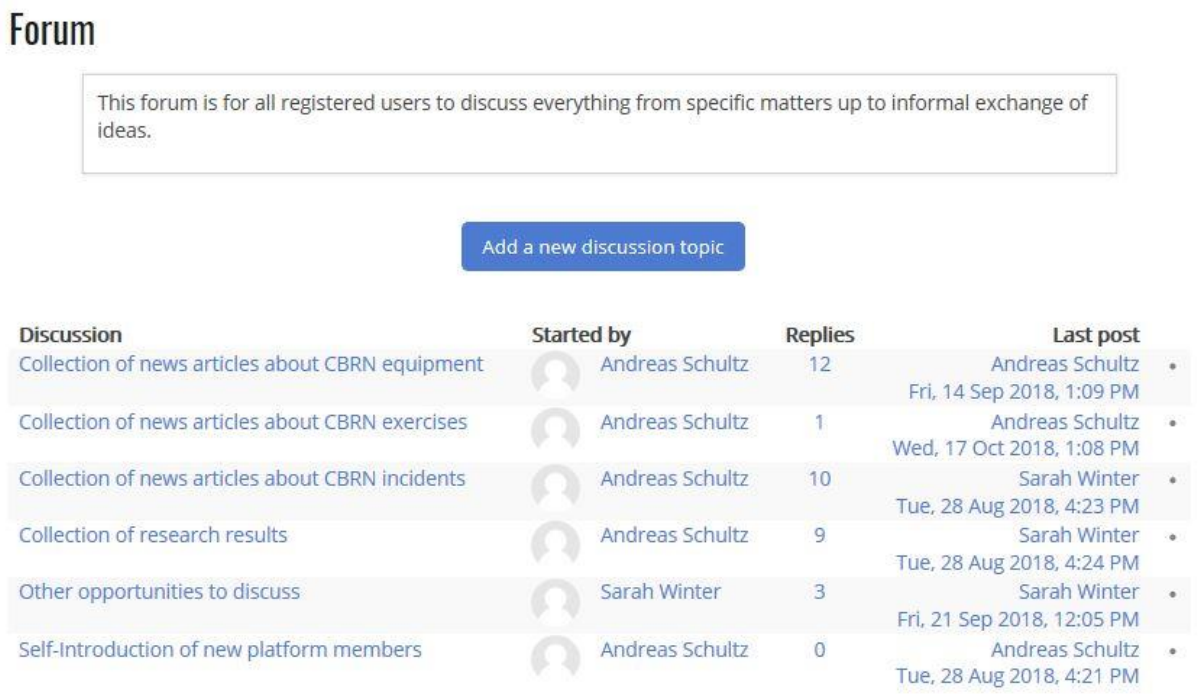


Figure 16: An overview of the topics available in the forum

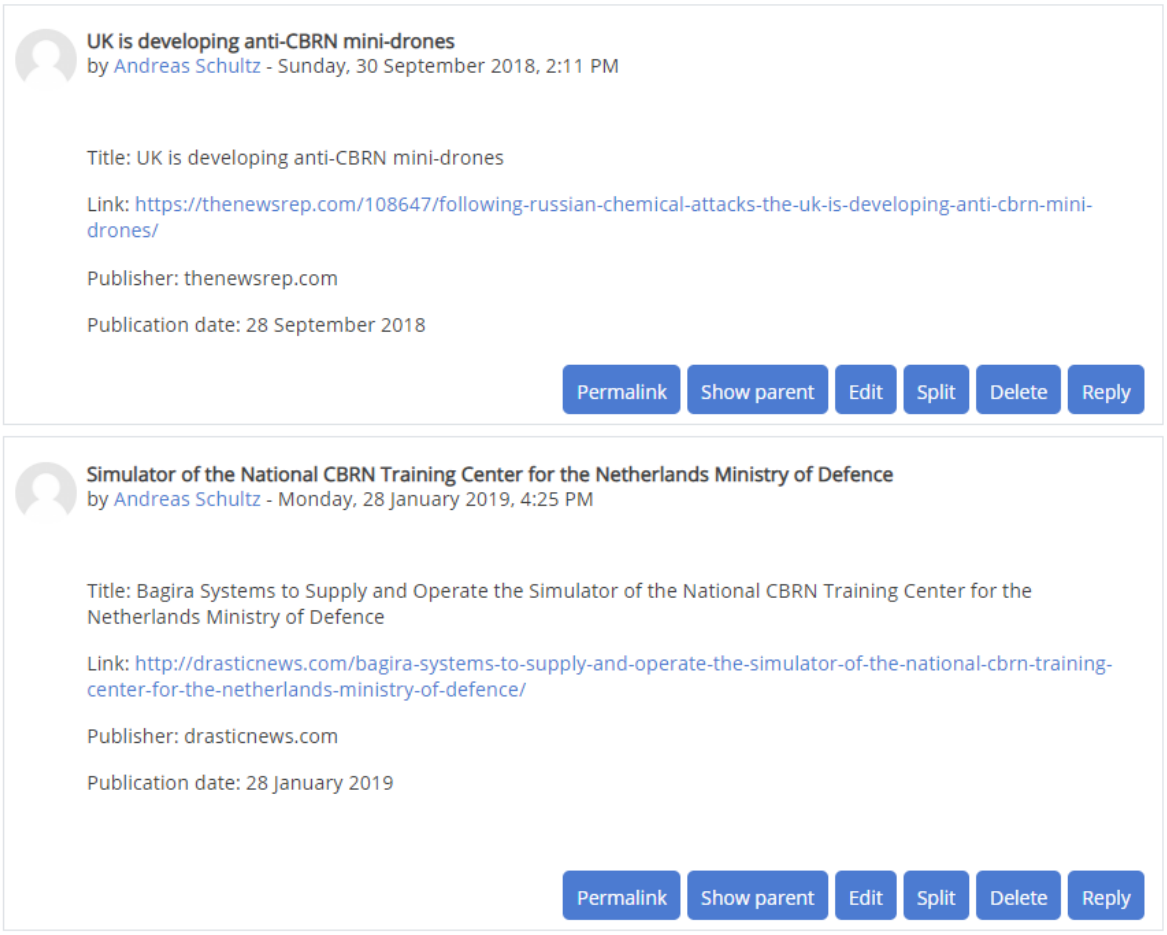


Figure 17: A forum thread collecting CBRN-related news

5.3.12 Glossary

Figure 18 shows the glossary, currently consisting of over 700 entries. Most CBRN-specific entries are provided by the European CBRNE Glossary by JRC, but the glossary has been extended to explain eNOTICE-specific terms such as ECC.

The screenshot also demonstrates the auto-linking feature: The glossary entry for “A1 and A2” references “Becquerel”. Clicking on the referenced entry opens a pop-up with an explanation and the possibility to open further glossary entries. This feature works anywhere within Moodle, meaning that e.g. technical terms in forum discussions or calendar entries are automatically explained.

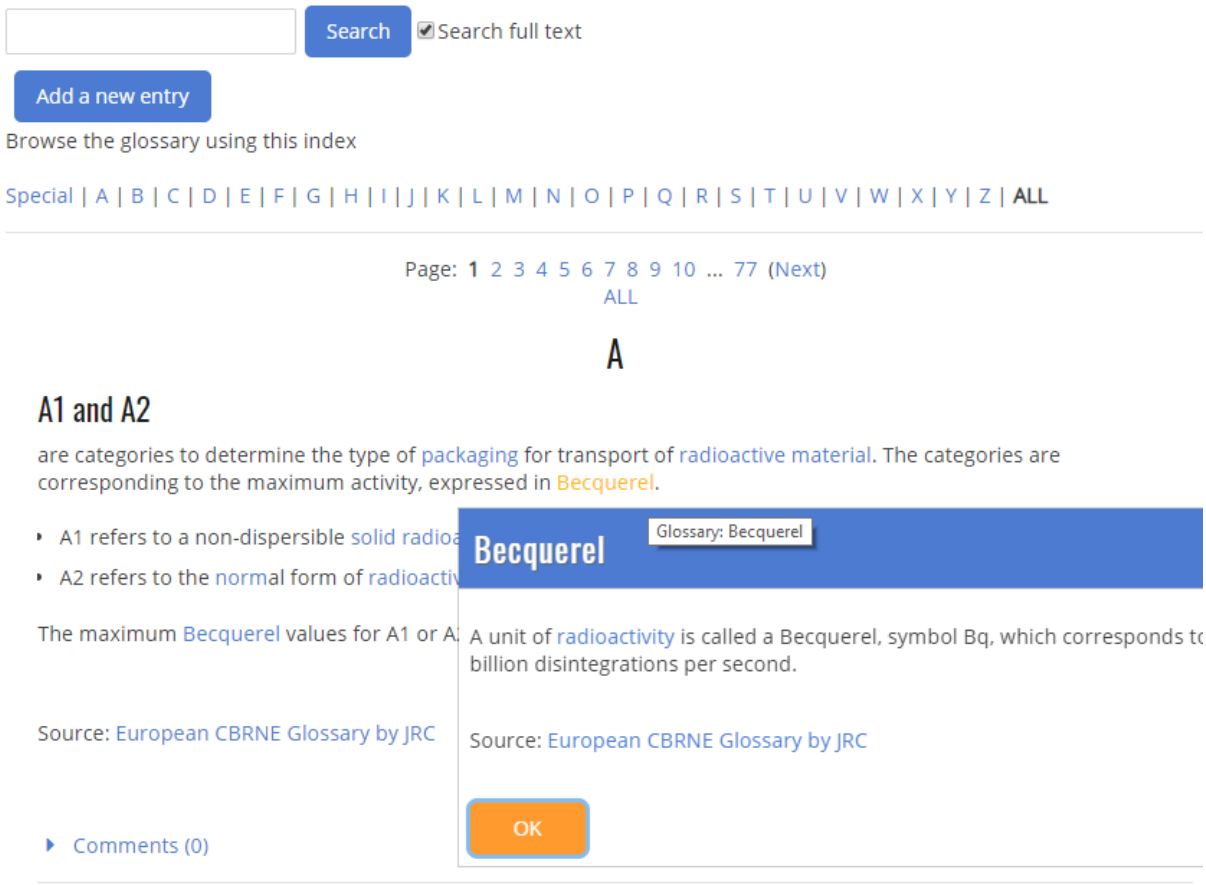


Figure 18: The glossary for one entry with a popup for a subsequent entry

5.3.13 Calendar

The basic overview of the calendar is shown in Figure 19. This view integrates events from the global calendar, the area-specific calendars and the personal calendar. Color codes indicate the source of each event and a filter can be used to only show events from a specific category. Clicking on an event within the calendar opens a more detailed view with a description and the location of the event.

Figure 20 shows the import interface of the calendar. Events from external calendars can be imported using the ical format and are refreshed periodically in pre-defined time intervals. Additionally, the import destination (global, area-specific or personal) calendar can be selected.

As shown in Figure 21, calendars can also be exported in the ical format. After selecting a time range and which types of events to export, an URL for exporting is generated. This URL could be used by other projects to display the eNOTICE calendar within their systems or to import the ECC calendar into a local Outlook calendar.

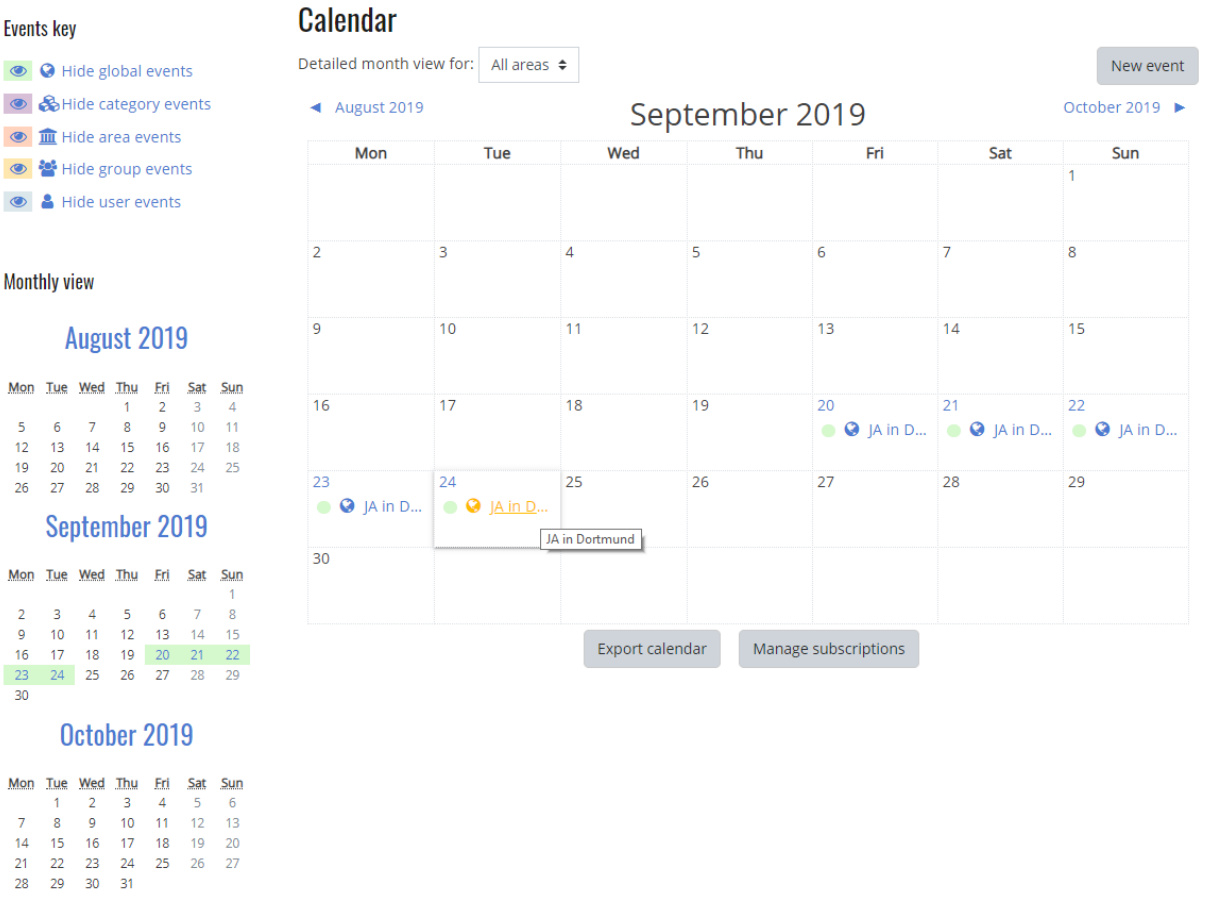


Figure 19: An overview of the calendar

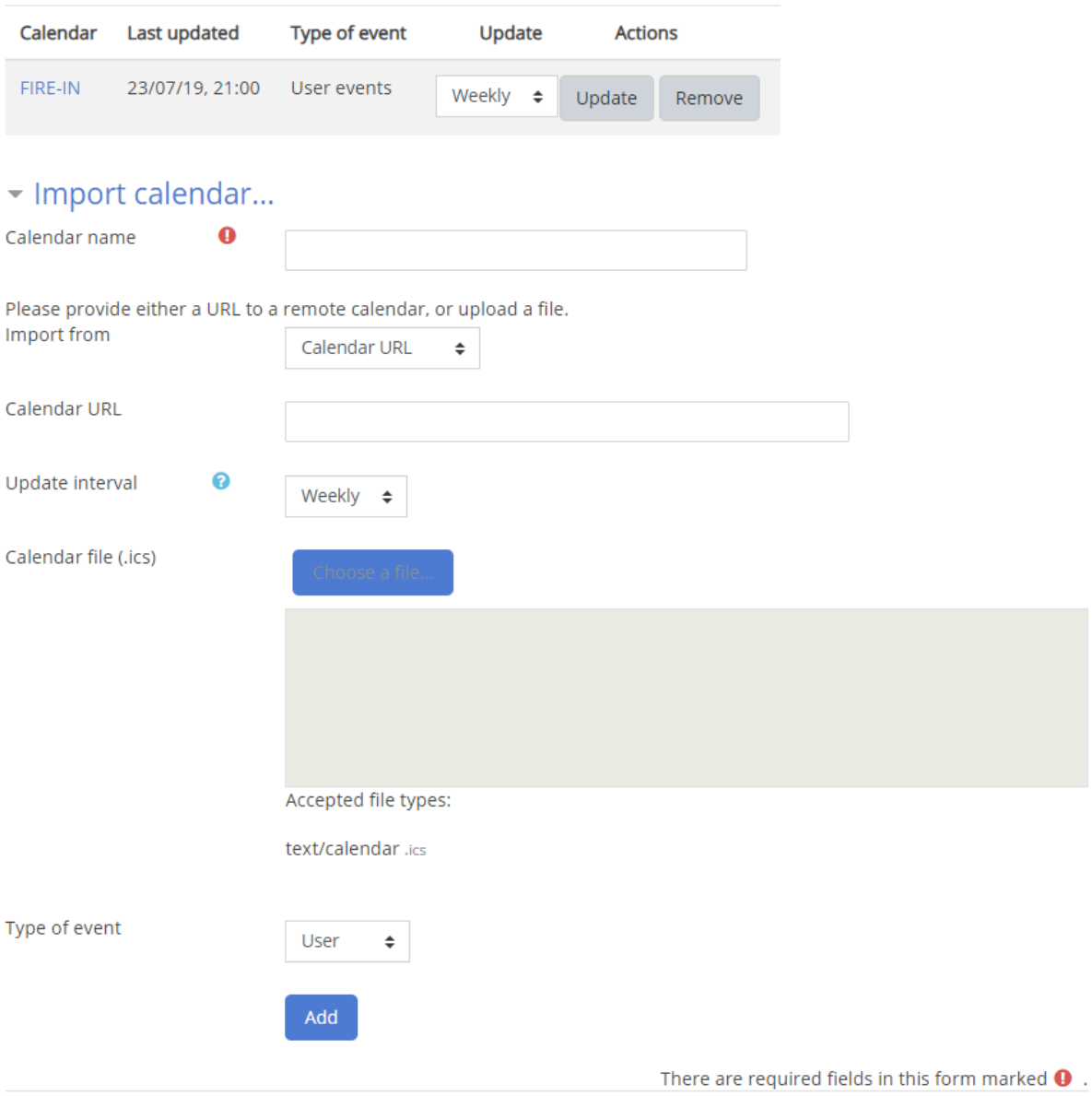


Figure 20: The import function of the calendar

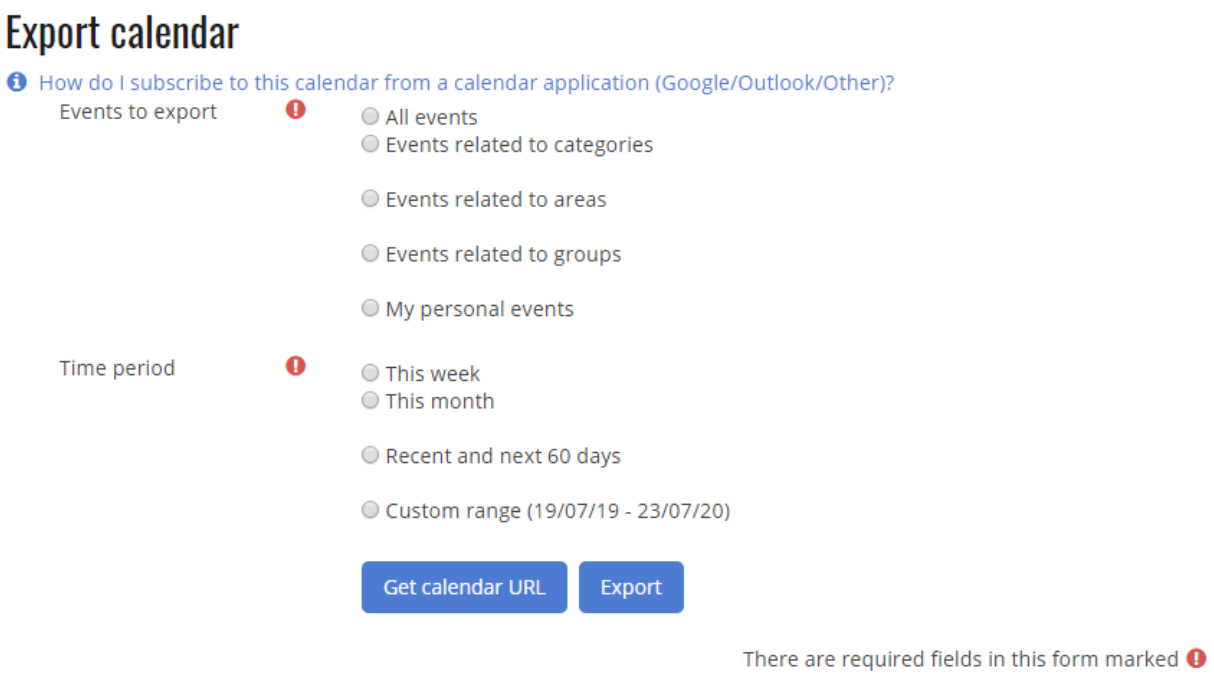


Figure 21: The export function of the calendar

5.3.14 Chat

Figure 22 shows the contact list of the chat function. Contacts can be contacted in direct chats or via group messages. A search function is available to search within all accessible old messages and contacts.

An additional chatroom can be made available privately for the members of an area. This constantly accessible chatroom can be used by the members of the area to discuss quick questions which do not require complex forum threads.

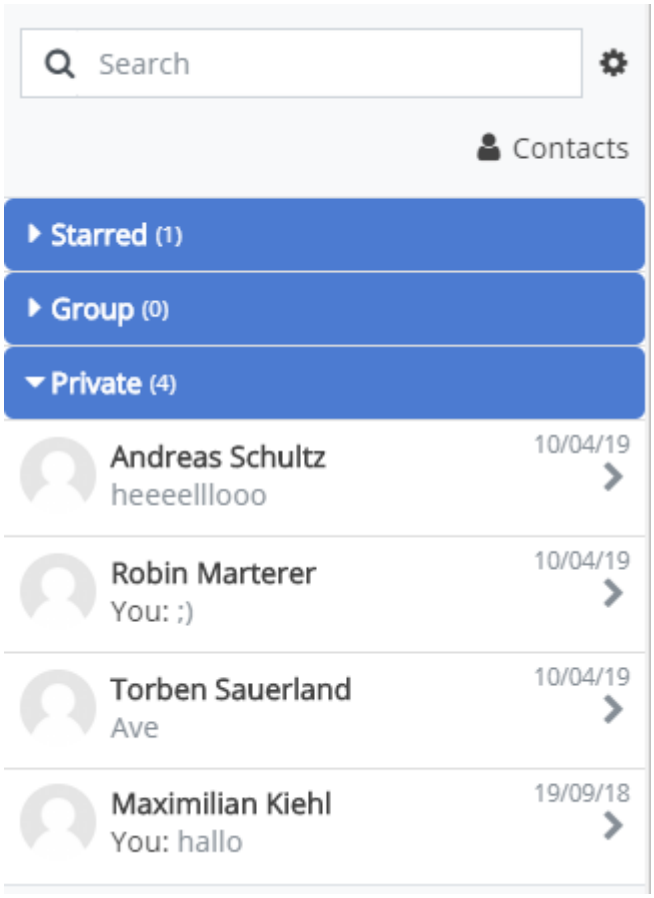


Figure 22: The chat contact list

5.3.15 Files

All previously presented features were implemented using Moodle, the subsequent features were implemented using Nextcloud.

An example of the file sharing function is shown in Figure 23, which displays the photos uploaded to several folders. After the Joint Activities, Nextcloud was used to collect photos from each participant and share them in a centralized fashion.

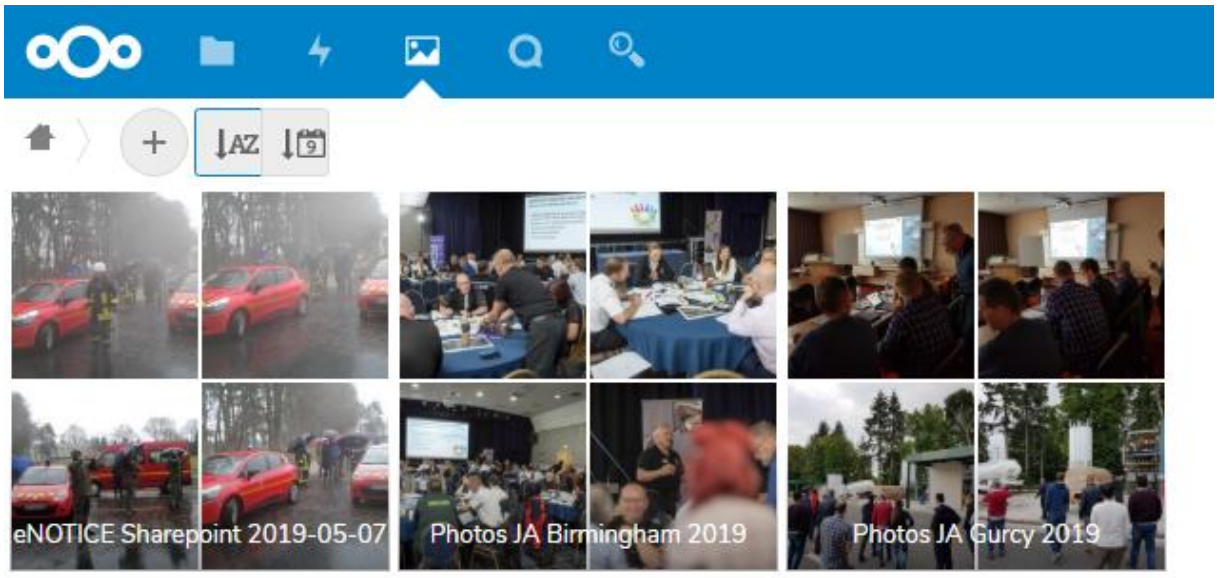


Figure 23: A gallery view of photos uploaded to the ECC

5.3.16 File Search

Nextcloud periodically indexes all available documents. This index can be searched using the file search app, as shown in Figure 24. In addition to the search term, the "Extension" filter can be used to only search for files with a specific extension.

The search results do not only display the files which were found, but also excerpts from the place within the document where the search term was found.

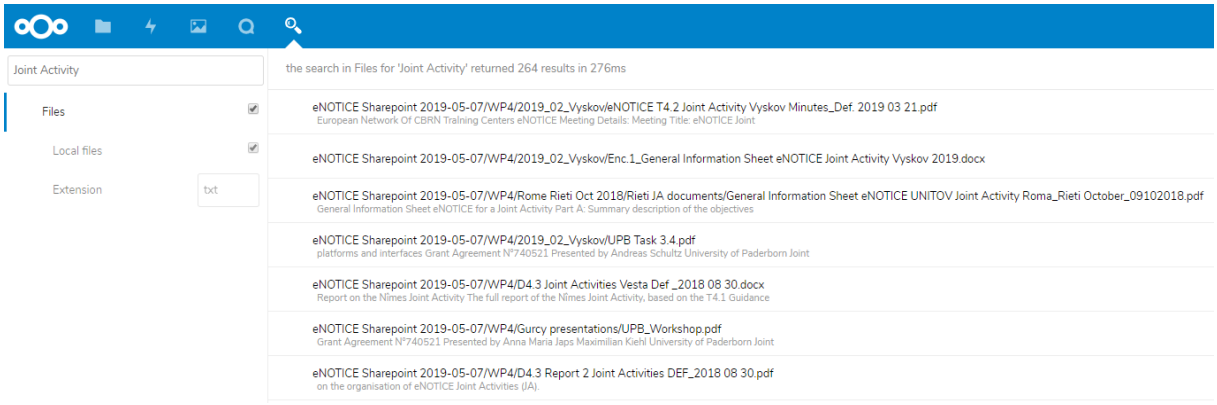
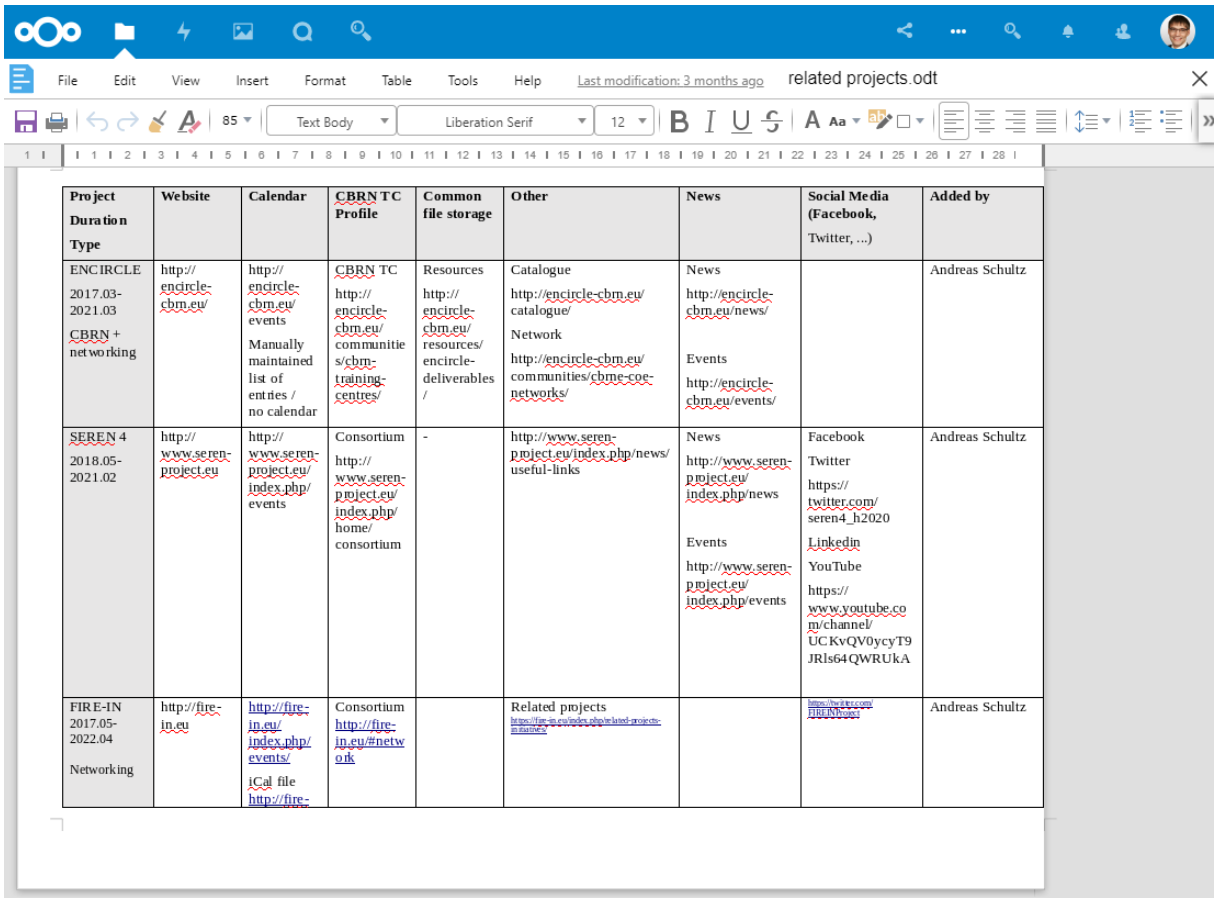


Figure 24: Results when searching for the term "Joint Activity"

5.3.17 Collaborative Document Editor

An important feature in combination with the file sharing app is the collaborative document editor shown in Figure 25. It features a fully-fledged office suite implemented using only modern web technologies within the browser.

Users can edit the documents collaboratively and see each other's changes and comments in real-time. This feature has proven useful for simple tasks such as collecting information but is not recommended for documents requiring complex formatting or advanced features such as macros.



Project Duration Type	Website	Calendar	CBRN TC Profile	Common file storage	Other	News	Social Media (Facebook, Twitter, ...)	Added by
ENCIRCLE 2017.03-2021.03 CBRN + networking	http://encircle-cbrn.eu/	http://encircle-cbrn.eu/events Manually maintained list of entries / no calendar	CBRN TC http://encircle-cbrn.eu/communities/cbrn-training-centres/	Resources http://encircle-cbrn.eu/resources/encircle-deliverables/	Catalogue http://encircle-cbrn.eu/catalogue/ Network http://encircle-cbrn.eu/communities/cbrne-coe-networks/	News http://encircle-cbrn.eu/news/ Events http://encircle-cbrn.eu/events/		Andreas Schultz
SEREN 4 2018.05-2021.02	http://www.seren-project.eu	http://www.seren-project.eu/index.php/events	Consortium http://www.seren-project.eu/index.php/home/consortium	-	http://www.seren-project.eu/index.php/news/useful-links	News http://www.seren-project.eu/index.php/news Events http://www.seren-project.eu/index.php/events	Facebook Twitter https://twitter.com/seren4_h2020 Linkedin YouTube https://www.youtube.com/channel/UCKvQV0ycyT9JRls64QWRUkA	Andreas Schultz
FIRE-IN 2017.05-2022.04 Networking	http://fire-in.eu	http://fire-in.eu/index.php/events/ iCal file http://fire-	Consortium http://fire-in.eu/#network		Related projects			Andreas Schultz

Figure 25: A table used for collaborative information collection from different users

5.3.18 Virtual Meeting Room

An example of a virtual meeting room is shown in Figure 26. The meeting rooms are persistent and calls within the rooms can be started at any point. This enables the permanent creation of rooms for specific purposes, e.g. for specialized groups within a TC. Rooms can either be accessed via direct invitation as a participant or via a link. In the latter case, no account on the ECC is required to join the room.

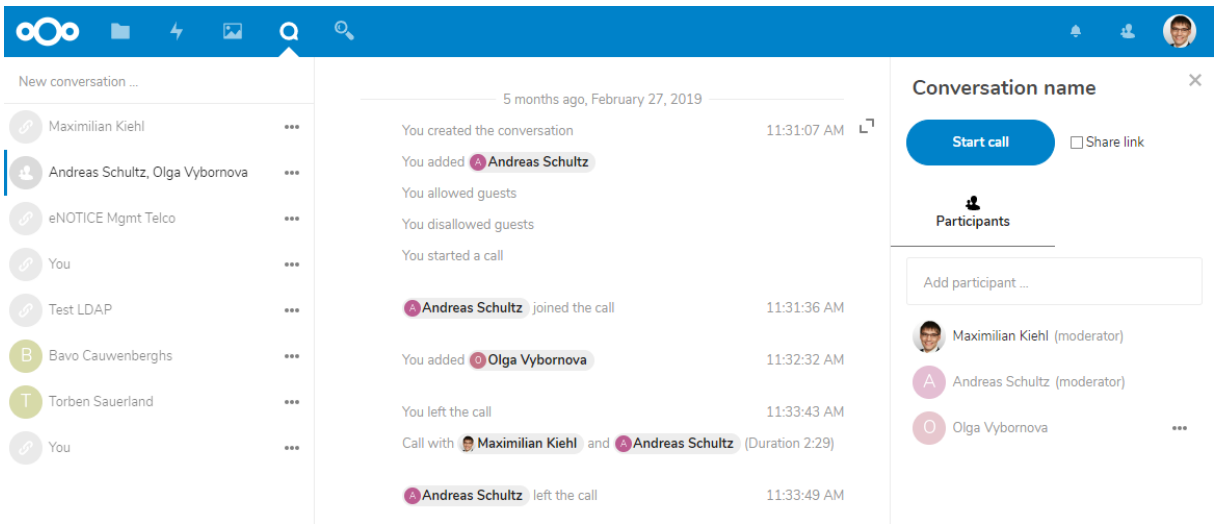


Figure 26: A Virtual Meeting Room with no call currently taking place

5.4 Activities and processes

This section explains some of the basic processes implemented in the ECC.

5.4.1 Registration

Registration is realized using the web application PWM[28], which creates the user accounts on the backend server.

Upon registration, users are requested to enter a username, password and their full name. After solving a CAPTCHA to prevent spam, confirming the email address and accepting the terms of service and privacy policy, the account is created in a suspended state. Personnel of SIC is notified by mail to check the plausibility of the entered data and activate the account after a positive review.

The review process is currently limited to a simple plausibility check, as an account on the ECC does not grant the user access to any sensitive information. Access to any closed area must be explicitly granted by the area owner.

5.4.2 Permissions

The ECC uses a permissions system which can be configured on a very detailed level but provides reasonable default settings.

Figure 27 shows the permissions dialogue displayed by Nextcloud when sharing a file. Files can either be shared via a link (no account required), with specific users or with groups of users. When sharing a file via a link, the user can specify further restrictions such as an expiration date, password protection or sharing the file read-only. When sharing with other users, the file owner can specify whether the recipients can edit and re-share the file. By default, files uploaded to Nextcloud are only accessible by the owner of the file.

[28] https://github.com/pwm-project/pwm

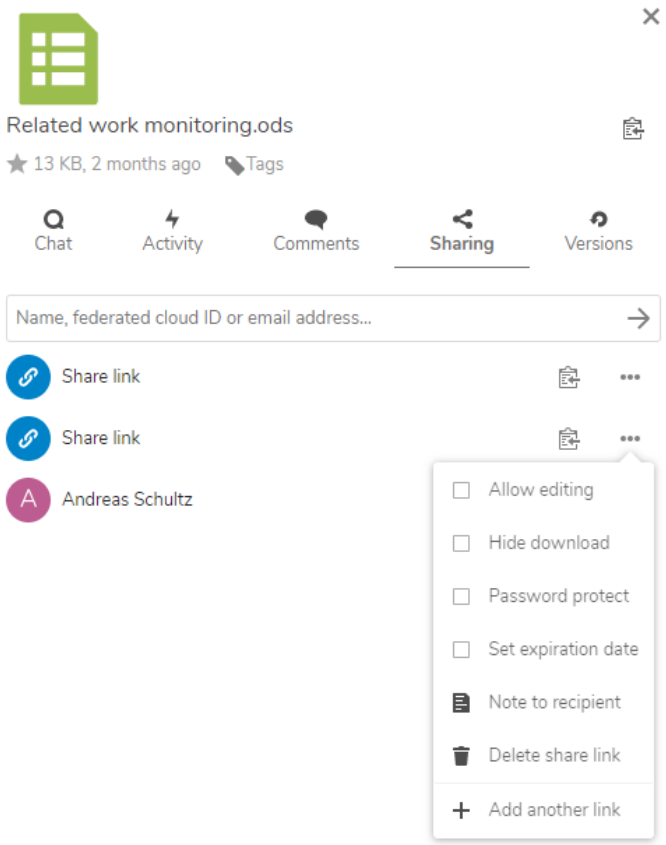


Figure 27: The permissions when sharing a file

The permissions system for tools within Moodle is displayed in Figure 28. The permissions for a forum displayed in the screenshot are very fine granular: For each activity in the forum (e.g. posting discussions, editing answers and uploading attachments) it can be specified which user role has access to that specific activity. The standard permissions are usually reasonable and need to be changed only in specific circumstances (e.g. creating a forum where users can only post replies but not start new discussions). By default, all tools within the General Area are available to all users of the ECC. Access to tools and data contained within other areas is only possible for members of that area and membership is approved by the owner of the area.

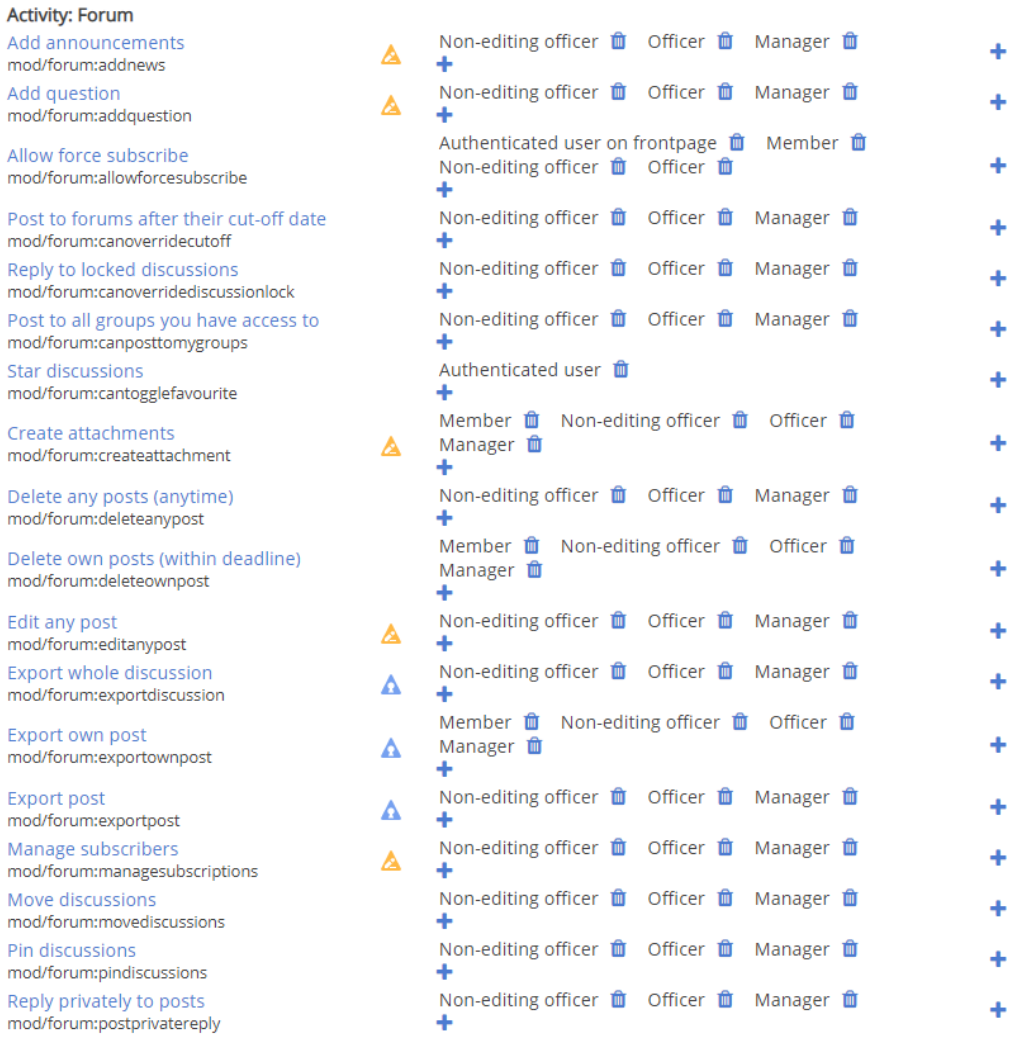


Figure 28: The permissions for a specific forum

5.4.3 Export of personal data

Access to personal data is a fundamental right codified in the GDPR. Therefore, both Moodle and Nextcloud provide functionality to request a personal data export. Moodle has an inbuilt functionality for requesting data exports, Nextcloud uses the Data Request[29] plugin.

Upon receiving a data export request, eNOTICE partner SIC as the responsible party for controlling the data is notified by email and can provide the user with an export of their data.

5.4.4 Creating a new area

Until now, only the General Area with access for all users was created. However, as explained in Section 5.1.2, the goal is to provide an own area to any interested party, e.g. TCs or specific interest groups.

Users can therefore request the creation of an area via email. An individual area consisting of only the tools required are then provisioned to the user. Areas can not only be closed and invite-only, but also configured to allow access by any registered user. Such open areas might

[29] https://apps.nextcloud.com/apps/data_request

be used when no confidentiality is required, and broad participation is desired. Users can find public areas via a list and by using the search function.

5.5 Hosting

As mentioned in Section 2.3, DevOps is used as the software development process. Therefore, the hosting of the ECC is an important part of this process.

OVH[30] was selected as the hoster as they provide stable servers inside the EU at a reasonable price. The servers run Ubuntu Linux and use Apache as a webserver and MySQL as the database backend. Nextcloud and Collabora CODE run within containers, Nextcloud uses Ubuntu's snap system and CODE uses docker. This containerization allows for easy upgrades and rollbacks of the software. Docker images are also available for Moodle[31], however they are currently not used in eNOTICE as they are not provided officially and the administration of Moodle via git has proved effective.

Backups are taken periodically to ensure that in event of a server failure, at most new data since the last backup is lost.

5.6 Sustainability

Long-term sustainability beyond the eNOTICE project duration was a key factor during the development of the ECC. By using only mature free and open source software, ongoing license fees for proprietary software are avoided and the risk of software development suddenly stopping is minimized.

Rather than always using the newest version of software products, long-term support versions were selected to decrease the administrative cost associated with constantly upgrading software to the latest version.

Ideas for potential future monetarization of the ECC after the duration of the project were also developed. This could include prominently displaying sponsoring TC, using an affiliate link for hotel bookings when linking to hotels on the TC and JA profile pages or charging money for premium features in individual areas.

More information on sustainability in eNOTICE can be found in D2.5.

[30] https://www.ovh.de/
[31] https://hub.docker.com/r/bitnami/moodle/

6 Evaluation

This chapter contains only a comparison between the identified requirements and the implemented features. The ongoing in-depth evaluation will be conducted by task 5.2.2.

As can be seen in the table below, most requirements were fully implemented and two were at least partially implemented.

Multiple languages were not implemented in the General Area, as eNOTICE is about networking and networking is only possible if a common language (English) is spoken. Of course, users can create their own areas and use them with languages other than English.

The integration of other platforms is subject to ongoing work in Task 3.4 and will be reported on in periodic deliverables.

No.	Feature	x/✓	Comment
1	Roster (Catalogue)	✓	
2	Profile of organizations	✓	
3	Profile of members	✓	
4	Means for sharing expertise and documents	✓	Implemented using forum, and file sharing tool. In the future, a wiki could also be added if required
5	Calendar	✓	Available globally, for each area and privately
6	User groups	✓	Implemented as “Areas”
7	Search function	✓	Due to technical reasons, multiple search functions for different types of searches were implemented
8	Rights system	✓	
9	Multiple languages	partly	Only the consortium page is available in multiple languages. Individual areas can use a language other than English
10	Monitoring platform activities	✓	Implemented using Matomo, for details see D5.6.
11	Integration of other platforms	partly	Interfaces are already implemented but not connected to other platforms yet
12	Live web communication	✓	
13	Question and Answer system	✓	
14	Subscriptions	✓	
15	E-Learning courses	✓	Available as a feature of Moodle but not used yet.

16	Chat	✓	
17	Registration	✓	
18	Forum		
19	Document sharing	✓	
20	Mapping and gap analysis	✓	The deliverable is available for download
21	Common language	✓	Implemented using the glossary
22	Sustainable	✓	

7 Conclusion

This chapter provides a short summary and way forward for the work on the ECC.

7.1 Summary

This deliverable presented a methodology for the development of the ECC. This methodology was then applied to gather requirements and to review the state of the art. Using this information, a concept for the ECC was described and subsequently implemented. This implementation was described and several other important aspects, such as the registration process and sustainability were elaborated. In the end, the implemented features were matched with the previously gathered requirements.

Although this process is described linearly due to the nature of a deliverable, in practice it was implemented iteratively. Constant feedback and refinement, in accordance with the methodology of design science, was used to arrive at the state described in this document.

7.2 Future work

Although V1 of the ECC is now online and can be used, it will be developed and improved further. Some requirements could not be fully implemented and will be addressed, and ongoing feedback will be used to develop new features, such as access to the ECC via apps. The evaluation, conducted in Task 5.2.2, is expected to yield useful feedback on parts of the ECC which could be improved. This further development work will continue in the context of Task 3.3.

Additionally, the existing open interfaces will be refined and potentially connected to other websites and networks within the work of Task 3.4.

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