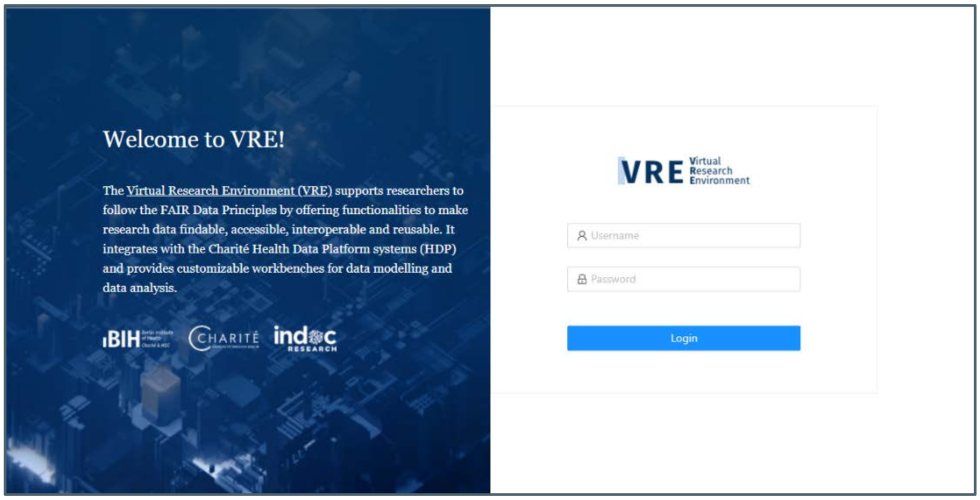
VRE Virtual Research Environment

USER GUIDE



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BIH Berlin Institute of Health Charité & MDC

Release: 0.2.0

Date: November 30, 2020

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1 Introduction

1.1 About the Platform

The Virtual Research Environment (VRE) was designed to make it easier for Researchers to find and securely access health data. Built on the FAIR guiding principles – Findability, Accessibility, Interoperability and Reusability – the VRE provides interoperability with international data commons like those developed under the European Open Science cloud, such as the Virtual Brain Cloud or the Human Brain Project, and operates as an extension of the Charité Health Data Platform (HDP) systems.

The VRE platform was designed by the Charité in collaboration with Indoc Research to extend and complement the functionalities of the Charité Health Data Platform (HDP). The VRE provides additional specialized methodology and technology capabilities for data processing, data management, visualization, and analysis including:

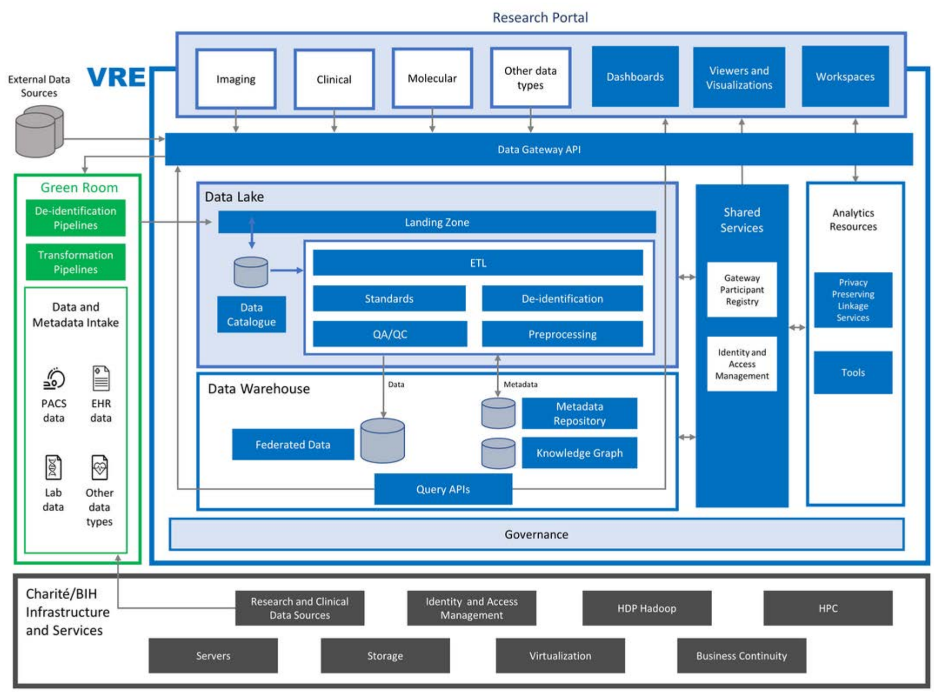
1. Workflows for radiologic imaging data
2. A model for cataloguing data and making it easier to find
3. Workbenches for modelling, simulating, and analyzing data
4. A Research Portal that is open also for external users who do not belong to Charité
5. Interoperability with international data commons like those developed under the European Open Science cloud, for example the Virtual Brain Cloud or the Human Brain Project

The development and requirement gathering process of the platform is ongoing. Existing architecture such as the Data Lake and data federation systems are designed to support the eventual integration of additional data sources and modalities such as clinical systems, electronic medical records, and genomics workflows.

1.2 Platform Architecture

The architecture of the VRE includes two distinct data storage areas: The Green Room and the VRE Core. The Green Room is a segregated data zone for the storage of data with personally identifiable information. The VRE Core supports the full lifecycle of data after being deidentified in the Green Room. The VRE provides a Researcher Portal to manage research projects, files and, users, data storage via Data Lake and Data Warehouse, and workbenches for researchers to perform secure modelling, simulation and analysis of data with Shared Services and Analytic Resources (**Figure 1**).

Figure 1. Schematic Diagram of VRE Components



1.3 Definitions

Charité/BIH Infrastructure and Services
Various IT systems and services are integrated to provide networking, computing, storage, and other infrastructure required by the VRE. Services include transfer of data from existing research and clinical data sources (e.g. file stores, REDCap, PACS) into the Green Room; Hadoop and other systems deployed within the Health Data Platform; high performance computing clusters for running preprocessing pipelines; and backup, recovery, and data archival systems that ensure that data are kept safe and available at all times.

Data Controller
Has the meaning ascribed to it under GDPR.

Data Gateway API
An application programming interface that enables the Research Portal to exchange data and metadata with VRE systems and allows the VRE to be interoperable with other data platforms, data sources and systems.

Data Lake
A zone within the VRE in which data of any type can be received, stored, catalogued, and ultimately ingested into platform databases. Standard data models and ontologies are applied to allow datasets to be aggregated and processed. Data can be further de-identified here for broader sharing. Quality assurance, quality control and preprocessing pipelines prepare the data for visualisation and analysis.

Data Processor
Has the meaning ascribed to it under GDPR.

Data Staging Pipelines
Workflows built into the VRE to allow automated processing of data. Pipelines help to eliminate or minimize manual intervention and facilitate a smooth flow of data from one stage to the next. Pipelines can be deployed to automate quality assurance, quality control, curation, validation, streaming, transformation, pre-processing, archival, and aggregation of data for downstream processes such as report generation, visualization, or query.

Data Warehouse
A set of databases and services which transform diverse data into a unified, federated context. Federation is critical for harmonizing data and metadata so that information about participants and datasets can be queried, visualized, and analyzed across studies, data sources, and modalities. The Metadata Repository and Knowledge Graph implement standardized and extensible schemas to represent metadata derived from datasets as well as annotations generated by researchers.

GDPR
The European Union General Data Protection Regulation.

Green Room

An environment in which hospital data, such as data derived from electronic health records (EHRs), picture archiving and communication systems (PACS), laboratories, and other sources, can be de-identified, transformed, and prepared prior to being transferred to VRE Core systems and made available for research use.

Research Portal
The primary interface for researchers to access VRE functions and resources, including data capture tools, interactive dashboards and viewers, query tools, and analysis workspaces.

Virtual Research Environment

A platform designed by the Charité in collaboration with Indoc Research to facilitate secure data storage, analysis, and collaboration among members of a research project.

VRE Core

An environment in which de-identified hospital data, such as imaging, clinical and molecular data derived from electronic health records (EHRs) and other sources, can be securely stored, federated, and analyzed. Data is transferred to the VRE Core after undergoing de-identification and transformation pipelines in the VRE Green Room.

Workspaces and Analytics Resources

Workspaces are flexible and interactive environments in which users can access, visualise, and analyse their data with a range of analysis and visualisation tools. These are supported by underlying computing infrastructure as well as privacy preserving linkage systems that allow de-identified datasets to be linked and compared.

2 Getting Started

2.1 Creating a Project in the Virtual Research Environment

Researchers interested in using the VRE should contact the VRE Support Team at vre-support@charite.de to discuss the application process and next steps. As the Data Controller, the Principal Investigator of each research project is expected to obtain all necessary data sharing agreements, research ethics approvals, and institutional data protection office endorsements to protect the rights of the data subjects before using the VRE.

After these requirements have been met and the project is approved by the Charité, the VRE administrative team will initiate the Project in the VRE, invite the first Project Member, and grant them the role of Project Administrator. The Project Administrator can invite additional members of their research team.

2.2 User Account Registration

If you have been invited to a VRE Project, you will receive an email containing an invitation link. Click on the link to create your VRE account. You will be asked to provide:

- Username (between 1 - 32 characters, lowercase letters, and numbers; must be unique in the VRE)
- Your First and Last Name
- Your choice of password (see Section 2.4.3 Password Requirements)

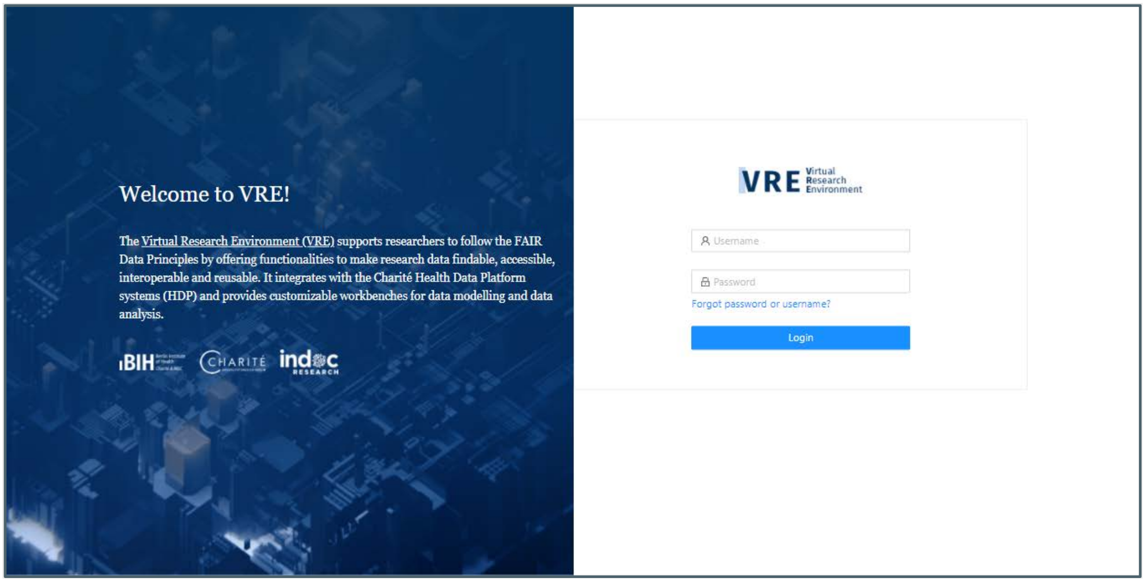
You will also be asked to review the Terms of Use and click **Agree** to finalize your registration. You are now a member of the VRE Project.

> **Note:** The VRE portal can be accessed using Google Chrome, Firefox, Microsoft Edge, and Safari. Some older browser versions as well as Internet Explorer may not be supported.

2.3 Logging into the Virtual Research Environment

To access the Virtual Research Environment (VRE) start by opening a supported web browser (Chrome, Firefox, Safari, or Edge).

1. Visit the VRE portal at https://vre.charite.de/vre in your browser and enter your username and password.



2. For security reasons, you will be logged out automatically after five minutes of inactivity. To log out manually, click on your username in the top right of the Main Menu and select **Logout**.

2.3.1 Finding Projects in the Landing Page

The **Landing Page** is the first entry point after login. From here you can browse basic information about Projects in the VRE and access your Project.

1. The **My Projects** tab displays a list of the Projects to which you have been given access, along with some basic information about the project. The **All Projects** tab displays all the projects registered in the VRE. Even though you can discover and browse the basic information about all projects, you can still only access the projects to which you have been given access.
2. Click **Sort** to order the Projects by different sort criteria.
3. Open the **Search Panel** to search by various project attributes.

2.4 Account Settings

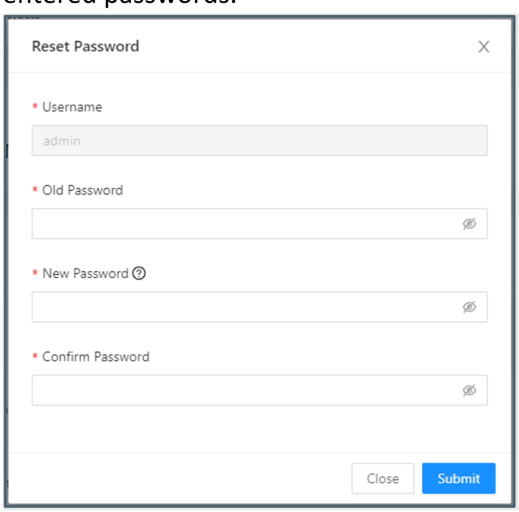
2.4.1 Password Reset

To change your password:

1. Log in to the VRE portal https://vre.charite.de/vre in your browser and enter your username and password.

   Click on your username in the top right-hand corner of the *Projects* main page and select **Reset Password** from the dropdown

2. Enter your username, previous password, and new password. Use the button to view the entered passwords.

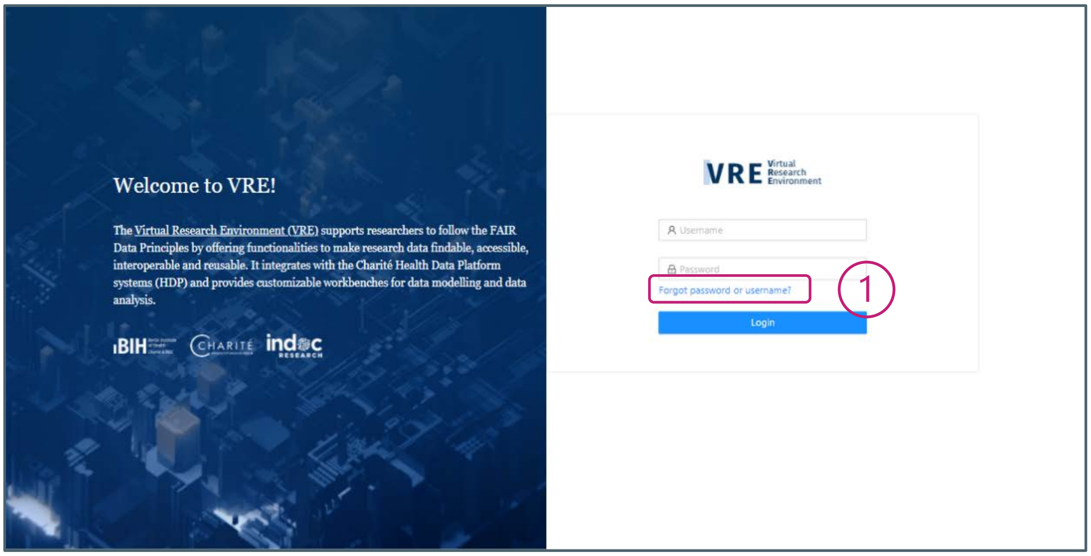


3. Click **Submit**

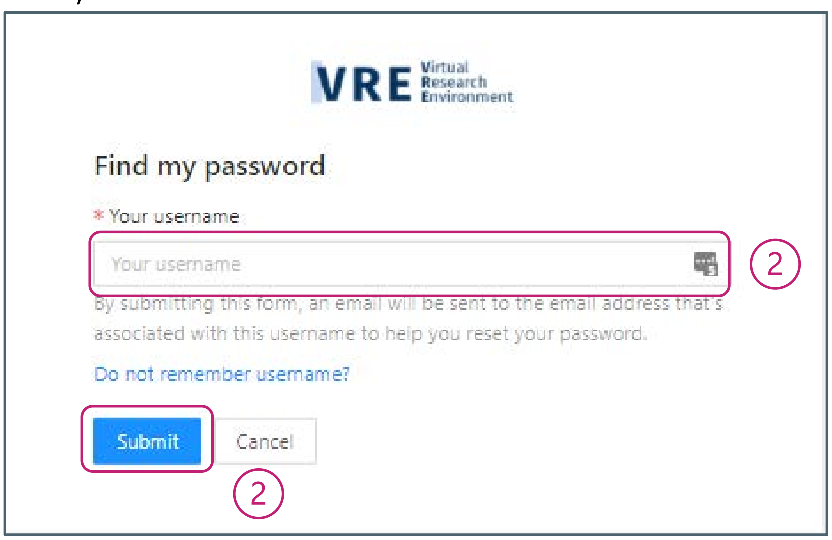
2.4.2 Forgot Password or Username

If you have forgotten your username or password:

1. Navigate to the VRE portal https://vre.charite.de/vre in your browser and click the link **Forgot password or username?**



2. Enter your username and click **Submit**



3. An email containing a password reset link will be sent to the email address associated with your VRE user account. The password reset link will expire after 1 hour without action, and/or will be expired immediately when the reset process is finished.

Note: If you have forgotten your username click the ***Do not remember username****?* link and an email containing your username will be sent to the email address associated with your VRE user account.

2.4.3 Password Requirements

- Passwords must meet the following criteria:
    - Length between 11-30 characters,
    - at least uppercase letter (ABCDEFG...XYZ)
    - at least one lowercase letter (abcdefg...xyz)
    - at least one number (0123456789)
    - at least one of the following special characters: `- _ ! % & / ( ) = ? * + # , . ;`

      Other special characters are not permitted.

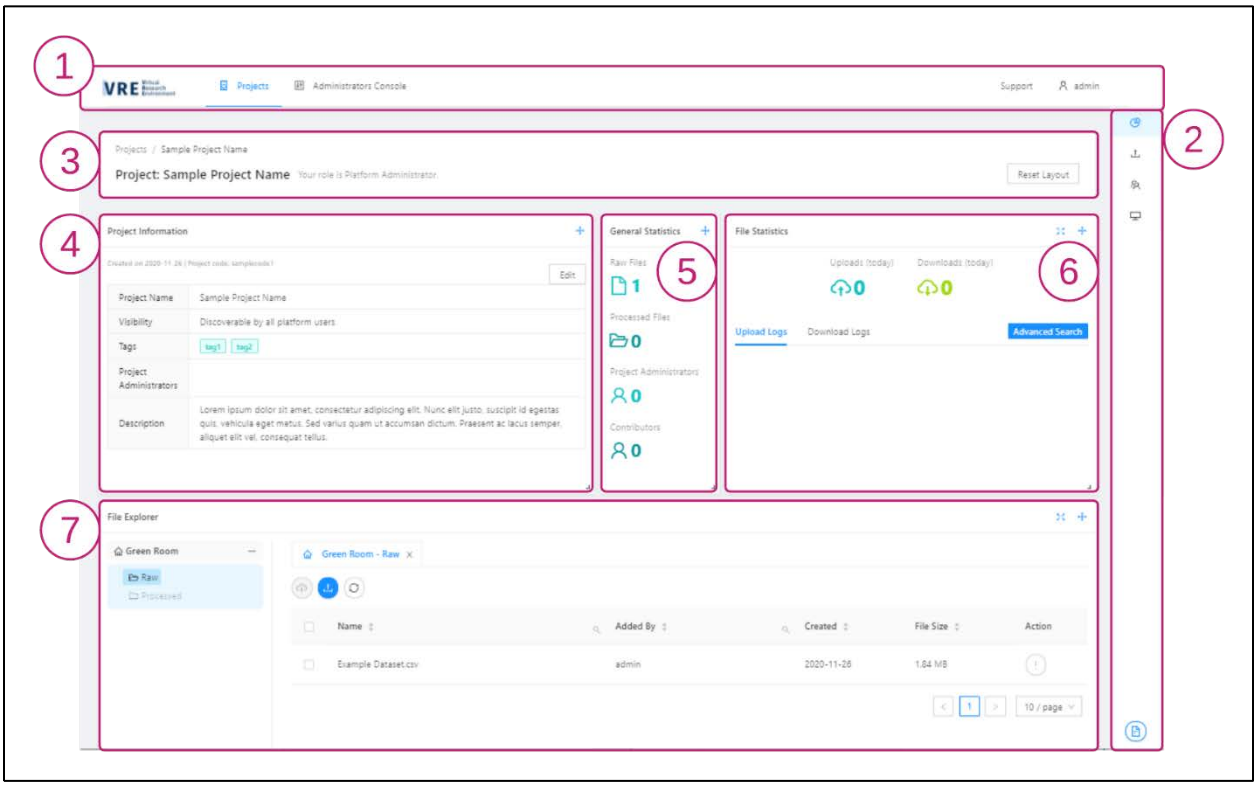
- Trivial and already compromised passwords as well as first names, family names or usernames (alone and exclusively or as part of the password) are not to be used
- Passwords must be changed after confirmation or if there is a reasonable suspicion that they have been compromised or have been noticed by third parties

3 Project Canvas

3.1 General Layout

The Project Canvas has seven main components:

1) Main Menu
2) Right Sidebar
3) Project Title bar
4) Project Information card
5) General Statistics card
6) File Statistics card
7) File Explorer card



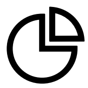
Note: Cards with a blue directional arrow icon can be rearranged by clicking the icon and dragging the card to a new location on the canvas. Click the *Reset Layout* button in the Project Title bar to restore the card configuration to the default layout.

3.1.1 Main Menu

The Main Menu is used to navigate to the *Projects Landing Page, Administrators Console,* and *Support Page*, as well as to access your *Profile* by clicking your username, where you can also log out or reset your password.

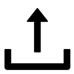
3.1.2 Right Sidebar

The Right Sidebar is used to access Project tools:



Canvas

Homepage of a VRE Project. Displays *Project Information*, *General Statistics*, *File Statistics*, and *File Explorer*.



Upload
Opens the *Upload Files* modal where Members can select files from their local machines to upload to the Project.

Teams

Navigation to the *Members* page where Administrators can view all Project Team Members, add Members, change Member's roles, and delete Members from the Project.

Jupyterhub

Coming soon: When configured, allows access to Jupyter hub, a computational environment with pre-installed resources and maintenance tasks.

Files Panel

Opens the *Files Panel* in the current page. This panel displays the status of files that are currently uploading or downloading as well as the status of previously uploaded files.

3.1.3 Project Title Bar

The *Project Title bar* provides the Project navigation path, the Project Title, your user role in the Project, and allows you to reset the *Project Canvas* to the original card configuration.

3.2 Project Canvas Cards

3.2.1 Project Information

The Project Information card displays basic information about the Project:

- **Created on:** Date the Project was created in the Platform.
- **Project Code:** A code used by VRE backend services to uniquely identify the Project across the VRE. The Project Code cannot be changed.

- **Project Name:** A short and user-friendly title assigned to the Project to make it easier for Members to identify and locate the Project. This information can be changed by the Project Administrator.
- **Visibility:** Provides information on who can see the Project name and description in the **All Projects** view on the Landing Page. This information can be changed by the Project Administrator. Checking the box makes the Project visible to all platform users; unchecking the box restricts visibility to Project Members only.
- **Tags:** Keywords that can be assigned to help organize and find information in the VRE. Project Tags can be added or changed by the Project Administrator.
- **Project Administrators:** Displays the Project Administrator(s) for the Project. Click a name to open an email and submit an inquiry to the Project Administrator.
- **Description:** A longer, more informative description of the study. This information can be changed by the Project Administrator.

Visible only to Project Administrators: The Project Information card also includes an *Edit* button for Project Administrators to edit the *Project Name, Tags, Visibility,* and *Description*. After editing any of these fields, click the **Save** button to apply the changes to the Project. See Section 4.2 Editing Project Information for more details.

3.2.2 General Statistics

Visible only to Project Administrators. Four statistics are displayed:

1. Number of **Raw files** in the Project (files uploaded)
2. Number of **Processed files** in the Project (files processed by pipelines; if applicable)
3. Number of Project Members with the **Project Administrator** role
4. Number of Project Members with the **Contributor** role.

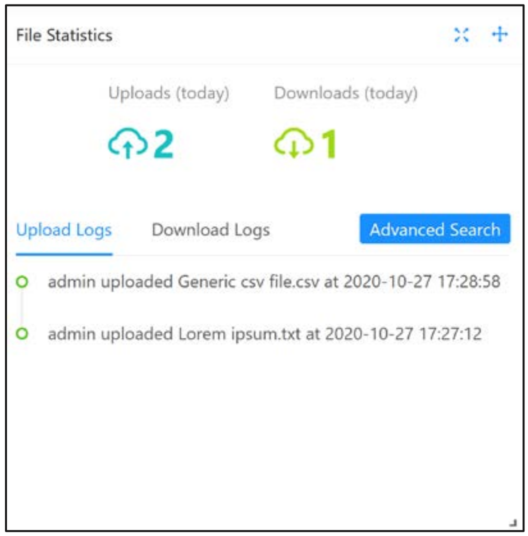
3.2.3 File Statistics

Two statistics are displayed:

1. **Uploads (today)**: Number of files uploaded to the Project today
2. **Downloads (today)**: Number of files downloaded from the Project today.

This card also lists the ten most recent Upload and Download events.

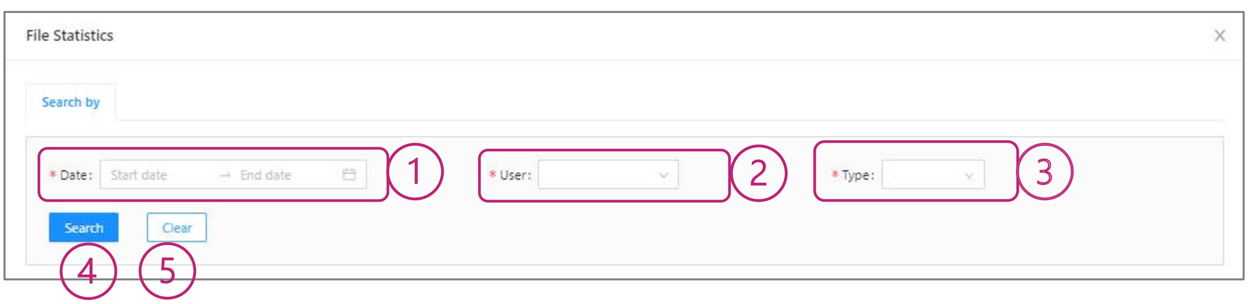
The information displayed in the File Statistics card depends on your user role. Project Administrators can view File Statistics for the entire Project, whereas Contributors can only view File Statistics for their own files and actions.



3.2.4 File Statistics – Advanced Search

Search and view detailed file activity logs by clicking **Advanced Search** in the *File Statistics* card to open the File Statistics Search panel.

Project Administrators can explore statistics for the entire Project, whereas Contributors can only explore statistics for their own files and actions.

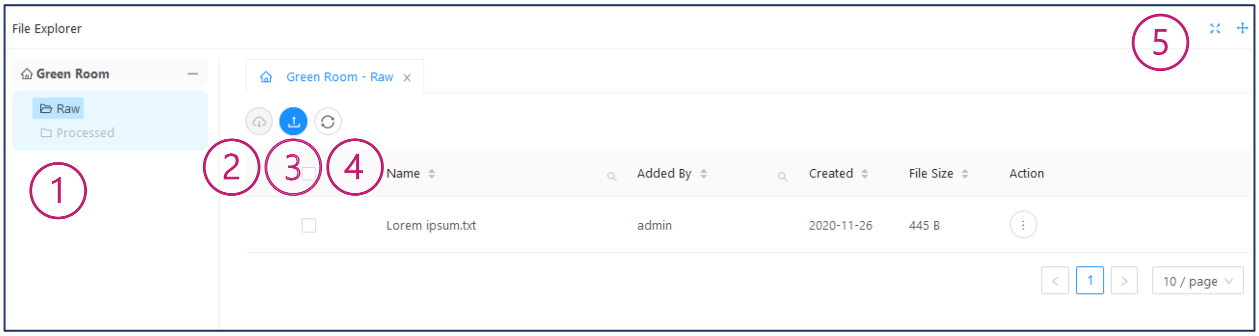


1. Choose the date range you wish to search by either clicking the date picker icon or by entering the desired start and end dates into the *Search by* bar in the format YYYY-MM-DD
2. *Project Administrators only:* Select the Project Member you wish to search by selecting their username from the *User* dropdown
3. Filter the Log entry type by selecting **Upload** or **Download** from the *Type* dropdown
4. Click **Search** to view all Log entries that match your search criteria
5. Click **Clear** to begin a new search

3.3 File Explorer

3.3.1 Layout

The *File Explorer* offers several features to view, upload, and download files and to search and sort files. The folders displayed may vary from the example below depending on your project.



1. **File Explorer Folder list** shows the available folders. Click a folder to view its contents in the **File List**. If you don't see a folder, it may be because your user role does not allow you to see it. Contact the Project Administrator for questions about access. Folder tabs can be closed by clicking the **X** beside the folder name.
2. **Download** button. See Section 3.5 File Download for more details.
3. **Upload** button. See Section 3.4 File Upload for more details.
4. **Refresh** icon refreshes the File list from the database. Refreshing your browser page will also refresh the File list.
5. **Expand** icon expands the *File Explorer* into a larger window.

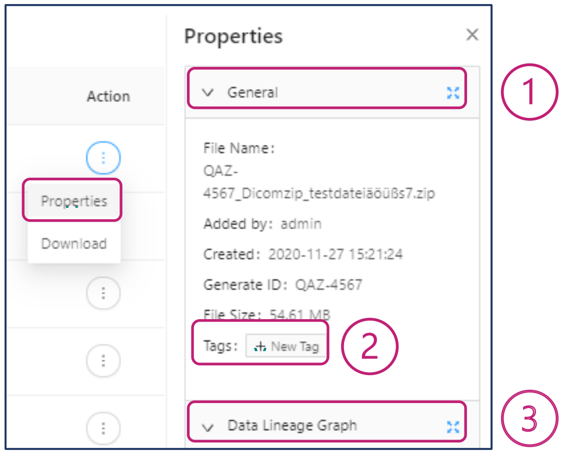
The following columns and options are available in the **File List** of the selected folder:

- **Name**: search and sort by filename.
- **Added By**: search and sort files by the user who uploaded/created the file.
- **Created**: sort files by the uploaded/created date.
- **File Size**: sort files by size.
- **Action**: For more file actions, click the *Action menu* (vertical ellipsis). Available actions are *Properties* and *Download*. See Section 3.3.2 File Properties for more information.

Note: To view the upload and download logs of your current session click the **Files** icon at the bottom of the Right Sidebar to open the *Files Panel.*

3.3.2 File Properties

A File's **Properties** can be viewed by clicking the *Action menu* ⋮ icon beside the file and selecting *Properties*.



Available Properties:

1. **General** – Displays *File Name*, *Added by*, *Created*, *File Size* and *Tags*.
2. **Tags** – Displays the file tags.
   - If no tags have been assigned, click **New Tag** to add one or more file tags.

   - To modify or remove existing tags, click **Edit Tags**. When adding a new tag, press the **Enter** key to complete entry of the new tag. When done editing tags, select **Finish Edit**.

3. **Data Lineage Graph** – Displays a history of the file's processing activity. See Section 3.3.3 Data Lineage Graph

3.3.3 Data Lineage Graph

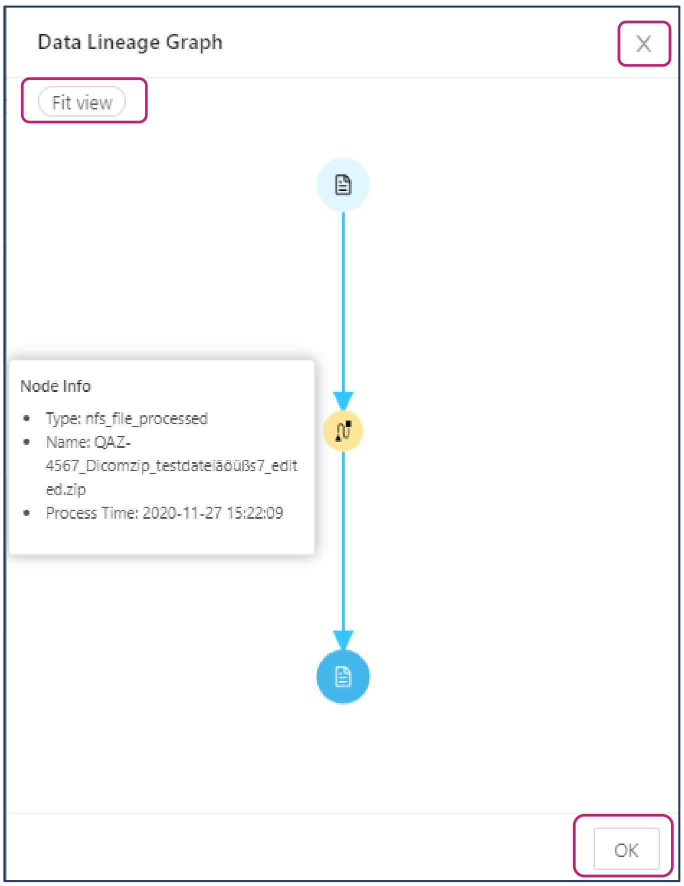
The **Data Lineage Graph** displays metadata about what happened to the file from upload to its current destination. This data provenance can be useful for discovering the data lifecycle of the file and for auditability and data governance.

The Data Lineage Graph is accessed from the File Explorer by clicking the *Action menu* ⋮ icon beside a file and selecting *Properties* > *Data Lineage Graph*.

Exploring the Data Lineage Graph

To view the Data Lineage Graph in a larger window, click the expand icon

1. The data lineage graph can be explored by scrolling with a mouse or scrolling with the *Ctrl* key held down to zoom in/out.
2. Select **Fit view** to refit the graph back to the default, centred state.
3. To close the Data Lineage Graph window, click **X** or **OK**.



Understanding the Data Lineage Graph

The data lineage graph displays file lineage information as nodes starting with file upload as the first node. If the file was processed or copied, additional nodes will be displayed. Hovering on a node displays *Node Info* containing the following information:

- **Type**: the file's metadata entity while in this state. For uploaded files this is always *nfs_file* (network file storage file)
- **Name**: the name of the file while in this state.
- **Process Time**: the end time of the processing activity.

Different icons distinguish the first and last node and any interim processing nodes.

Original File
Represents the original file upload, prior to processing. Hover over the file node to view the *Type, Name,* and *Upload Time* of the original file.

Processing

The Processing node indicates a processing activity such as a processing, pipeline, or copy/ delete actions. Hover over the Processing node with your cursor to view the processing action and the date and time it was completed.

Destination File

Represents the current state of the file in its lineage. Hover over the file node to view the *Type, Name,* and *Process Time* of the current file.

3.4 File Upload

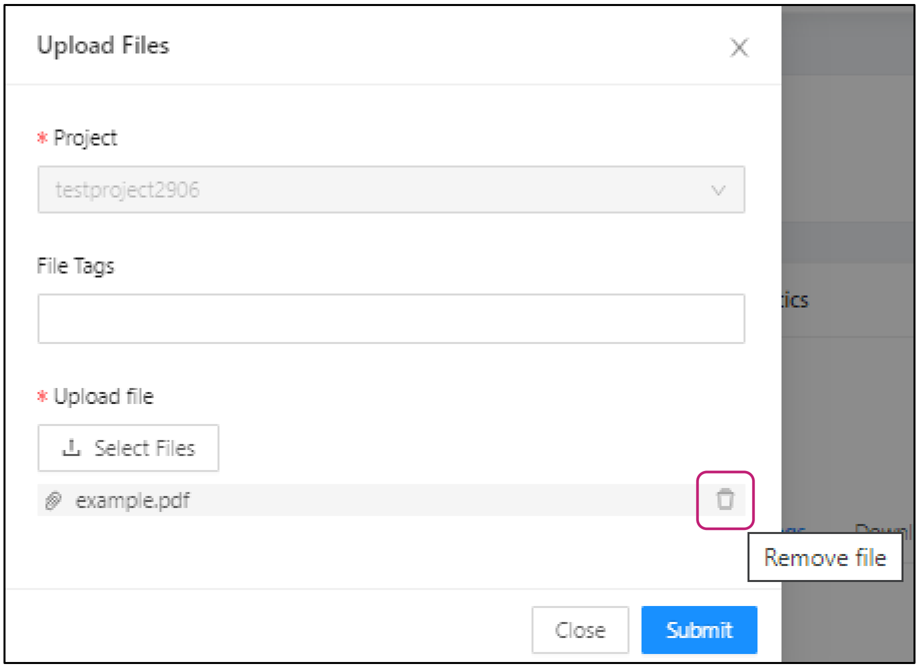
All Project Members are reminded to abide by the Platform Terms of Use, Data Sharing Agreements, and their obligations as Data Controllers when uploading files to the VRE.

All files uploaded to the VRE land in the Green Room storage. In this protected storage area Project Administrators can configure automated sanitization pipelines or other methods for pseudonymization of incoming files to ensure no sensitive personal information is transmitted to the VRE Core where broader research collaboration and analysis occurs.

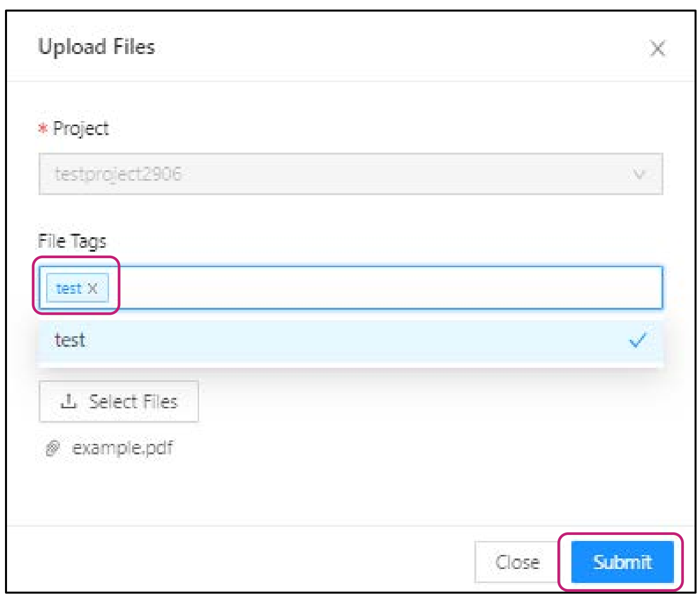
3.4.1 How to Upload a File to your Project

Files can be uploaded individually or in bulk from the *File Explorer*.

1. Begin by navigating to your Project and clicking either the Upload icon in the *Right Sidebar* or the Upload button in the *File Explorer* to open the *Upload Files* window.
2. The Project name is pre-filled and cannot be modified. Check the entry to confirm you are about to upload data to the correct project. (If not, close the window and return to the Landing Page to access the correct project).
3. Click **Select Files** to add one or more files from your local computer.
   Optional: Project-specific information such as a Participant ID or other information specified by the Project administrator may also be requested on upload.
4. Review the file list to verify that you have selected the correct files. If you need to remove a selected file, click the trash can icon to **Remove file**.



5. *Optional:* Add **File Tags** by typing in the *File Tags input box* followed by 'Enter'. A dropdown will appear if the entered text matches any tags that are attached to any other files in the Project. The tags will turn blue when applied to the upload and can be removed using the **x** button.



6. When ready, click **Submit** to begin uploading.

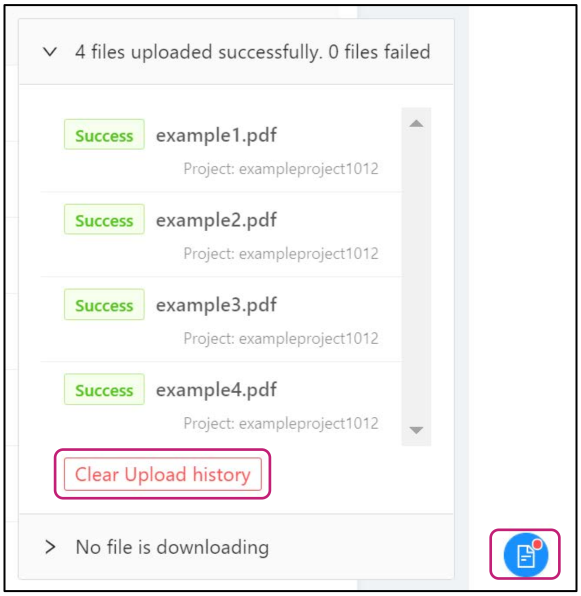
Once a file upload is initiated, the *Files Panel* will appear in the bottom right corner of the page. This panel displays the status of files that are currently uploading or downloading. It also maintains the status history of all files uploaded or downloaded during your current login session. Click on the Files Panel icon to show or hide the Files Panel. For more details See Sections 3.4.2 Checking File Upload Status and 3.5.2 Checking File Download Status.

For Projects preconfigured with automated pipeline on file upload, refer to Section 3.6 File Processing.

> **Note:** Your session will remain active during file upload. You should not logout or close your browser during file upload.

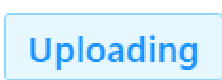
3.4.2 Checking File Upload Status

The Files Panel displays a status icon for each file uploaded during the current login session. A red dot on the Files Panel icon indicates that the status of one or more files has changed. To remove all previously listed File Upload logs, click **Clear Upload history**. The Files Panel is also cleared when you logout from the current session. Click the Files Panel icon one or more times to toggle between panel show/hide.



Possible file upload status icons are as follows:

A grey **Waiting** status means that another file is currently being uploaded and the file is waiting in the upload queue.



A blue **Uploading** status means that the file is currently uploading. A progress bar will appear showing the upload progress.

A yellow **Uploading** status means that the file upload is being processed.

A green **Success** status means that the file has successfully been uploaded and processed.

A red **Error** status means that there was a problem encountered during file upload. An error message popup will also appear at the top of your browser window.

3.5 File Download

All Project Members are reminded to abide by the Platform Terms of Use and their obligations as Data Controllers when downloading files from the VRE.

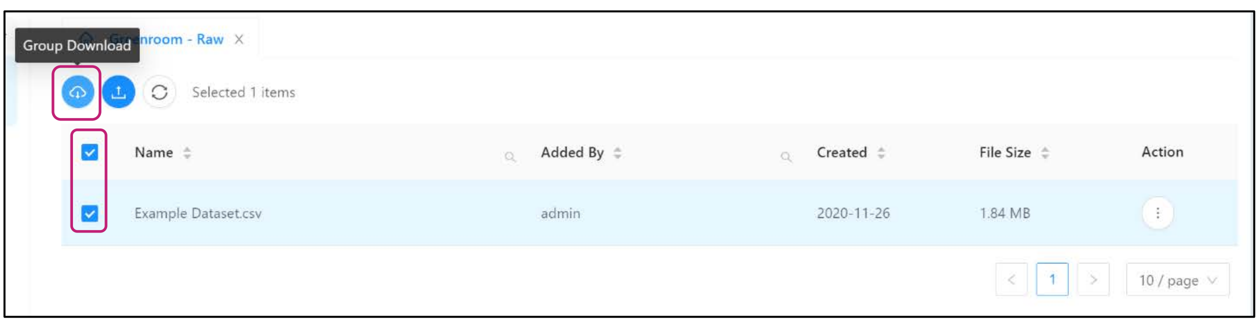
Project Administrators can access and download all Project Files, whereas Contributors can only download their own files.

> **Note:** Before attempting to download files, check that popups are enabled and that you have disabled any popup blockers in your browser as these may prevent you from downloading files from the VRE.

3.5.1 How to Download a File from your Project

Files can be downloaded individually or in bulk directly from the *File Explorer*.

1. Begin by navigating to your project and locating the folder of interest from the *File Explorer.*
2. For single file download, select the checkbox adjacent to the file. For bulk download, select checkboxes for multiple files *or* click the checkbox in the *File List* header to **Select All** files.
3. Click **Download**.
4. *Bulk Download only:* if you have selected multiple files for download the files will be packaged in a zip file. A filename containing the *Project Code* will be automatically generated.



Once a file download is initiated the *Files Panel* will appear in the bottom right of the Project Canvas page. This panel displays the status of files that are currently uploading or downloading. It also maintains the status history of all files uploaded or downloaded during your current login session.

3.5.2 Checking File Download Status

The Files Panel displays a status icon to indicate the status of the file during download. Click the Files Panel icon one or more times to toggle between panel show/hide.

Possible file download status icons are as follows:

A yellow **Downloading** status means that the file is currently being downloaded to your local machine.

A green **Success** status means that the files have been zipped successfully and are downloading.

A red **Error** status means that there was an issue downloading the file. An error message will appear at the top of your screen if an error is encountered while downloading a file.

3.6 File Processing

3.6.1 Sanitizing Green Room Files

All Project files and data enter the VRE through the Green Room. The Project Administrator specifies the sanitization procedures required for all incoming Project data files to ensure sensitive personal information is removed before the data reaches the VRE Core for broader research collaboration and analysis. For example, incoming files may require no action (file is already pseudonymized and no further sanitization is required) or may be subject to the execution of a pipeline to remove sensitive personal information. An example lifecycle of data files in the Green Room containing sensitive personal information and processed with a preconfigured sanitization pipeline is described as follows:

1. File stored in user's local storage
2. User uploads file to Project using VRE Portal interface
3. File lands in Green Room storage - *Raw* folder
4. VRE services detect file properties. Files matching preconfigured conditions trigger pipeline execution.
5. Pipeline executes.
6. The processed output file is stored in Green Room *Processed* folder (named after the pipeline)

If the Project Administrator has configured one or more automated sanitization pipelines for your project, the files in both the Raw and Processed state will be visible in the File Explorer.

> **Note:** Project Members with the Contributor role are only permitted to view the files that they uploaded in the Raw folder. They do not have access to view any other folders.

Additional tools and features for managing pipelines will be available in future releases of the VRE.

3.6.2 Approving and copying Green Room data to the VRE Core

This feature is coming soon in a future release of the VRE.

4 Project Management

A **Project** is a data storage container that holds all the information, data, and pipeline configurations relating to a Principal Investigators' research project. Projects in the VRE can only be created by Platform Administrators.

4.1 Creating Projects

Project creation is only available to Platform Administrators.

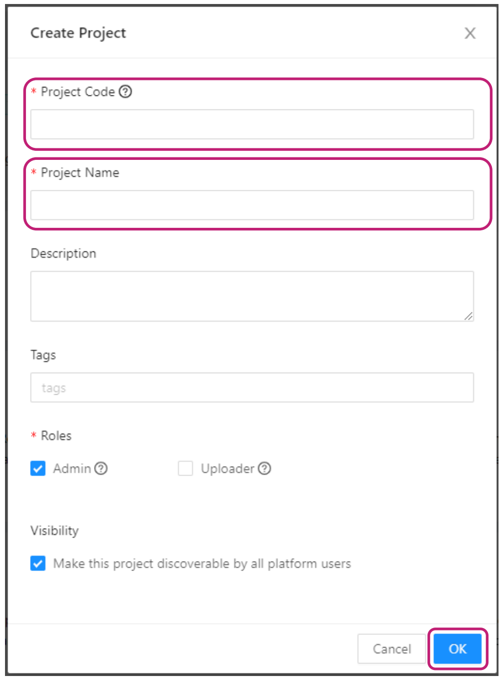
4.1.1 Prerequisites to creating new Projects

Before adding a Project in the VRE Portal, the final approval of the VRE Governance Manager must be obtained signifying that all applicable data sharing agreements, research ethics board approvals and data protection authorizations are secured.

4.1.2 Project Creation

1. Log into the VRE Portal with Platform Administrator credentials.
2. On the Landing Page, click the + New Project icon in the Right Sidebar.

3. Complete the required fields in the *Create Project* dialog box and click **OK**



4. The newly created Project will appear in the Projects list in the Landing Page.

4.1.3 Project Details

1. **Project Code** (required)
    - The *Project Code* is used by VRE backend services to uniquely identify the Project across the VRE. Project Code is mandatory for Project creation. Select a Project Code in conjunction with the Project Administrators.
    - <u>Once assigned, the *Project Code* cannot be changed</u>. *Project Codes* must follow the naming convention: maximum 32 characters, consisting of any combination of lower-case letters (a-z) and numbers (0-9).
2. **Project Name** (required)
    - A short and user-friendly title assigned to the Project to make it easier for users to identify and locate the Project. *Project Name* is mandatory for Project creation but can later be changed by a **Platform Administrator** or the **Project Administrator**.
3. **Description** (optional)
    - A longer, more informative Project field that can be used to add more context and inform users of study details. *Description* is optional for Project creation and can later be added or changed by the **Platform Administrator** or **Project Administrator**.
4. **Tags** (optional)
    - Tags are keywords that can be assigned to help organize and find information in the VRE. Tags are optional and can later be added or changed by the **Platform Administrator** or **Project Administrator.**

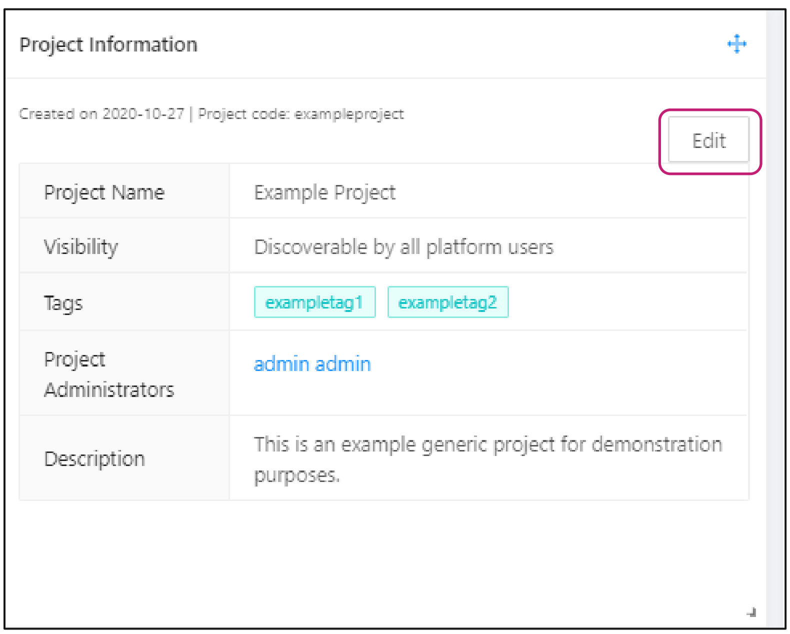
5. **Roles** (required)
    - Member Roles available in the Project. These roles will be made available to the Project Administrator when adding members of their research team to the Project. Refer to Section 5.1 User Roles for a description of the available project roles. Additional roles are optional.
6. **Visibility** (optional)
    - This setting controls whether the basic Project information is discoverable by all platform users in the All Projects tab of the Landing Page.
    - By default, visibility is set at "*Make this project discoverable by all platform users*". Uncheck this box if the Project should be private, only be discoverable by Project Members. The Project Administrator can edit this setting later using the Project Information card in the Project Canvas.

> **Note:** If the *Project Visibility* is set to "Discoverable" the *Project Code, Project Name* and *Description* will be displayed to all VRE users in the Project Landing Page **All Projects** tab.

4.2 Editing Project Information

Editing Project information is a feature available to Platform Administrators and Project Administrators.

Project information may be changed on the *Project Canvas* in the Project Information card. Click the **Edit** button to open Edit mode.



The following Project Information elements can be changed: *Project Name, Tags, Visibility,* and *Description*.

After editing any of these elements, click **Save** to apply the changes to the Project.

5 User Management

5.1 User Roles

Access to the VRE is controlled by project-based and role-based permissions. The combination of Project and user role defines which data and resources a user can access in the VRE. The VRE Platform Administrator creates the first Project Administrator user account; this user becomes the first member of a Project. Thereafter, the Project Administrator can invite or remove members of their research team to their Project.

An individual person may become a member of one or more Projects in the VRE upon invitation from the Project Administrator of each project.

A Platform Administrator may invite general members to the platform with no Project membership.

Member roles and functions available to Researchers are described **Table 1**.

Table 1. Platform User Roles

	General User	Project Contributor	Project Administrator
View list of Projects in the Landing Page	✓	✓	✓
Upload files		✓	✓
View my own files		✓	✓
Download my own files		✓	✓
View all Project files			✓
Download all Project files			✓
Authorize pseudonymization pipelines			✓
Add users			✓
Create Projects			

5.1.1 Project Administrator

The **Project Administrator** is the Principal Investigator (or their delegate) who has overall responsibility under GDPR as the Data Controller for the Research Project. They are responsible for all Project data stored in the VRE. They have the authority to invite other research members to the Project and assign their member roles within their project. Project Administrators can access all data related to their project, can register pseudonymization pipelines, view activity logs for all Project Files and Members, and manage users for their Project. A project may have more than one individual person assigned to the role of Project Administrator. This ensures role redundancy in case of absence.

5.1.2 Project Contributor

The **Project Contributor** is a member of the Project invited by the Project Administrator. Members with this role can contribute, or upload, data to the Project, view the list of files they uploaded to the Project using the *File Explorer*, and download the files they originally uploaded. Project Contributors cannot browse or download data contributed by any other member of the Project.

5.1.3 General User

The **General User** is a member of the VRE that has access to the public list of projects on the Project Landing page but is not a member of any Project. They must be invited by a Platform Administrator. Users with this role can view the list of public Projects but cannot access or upload data to any projects until they are invited to the project by an Administrator.

5.1.4 Platform Administrator

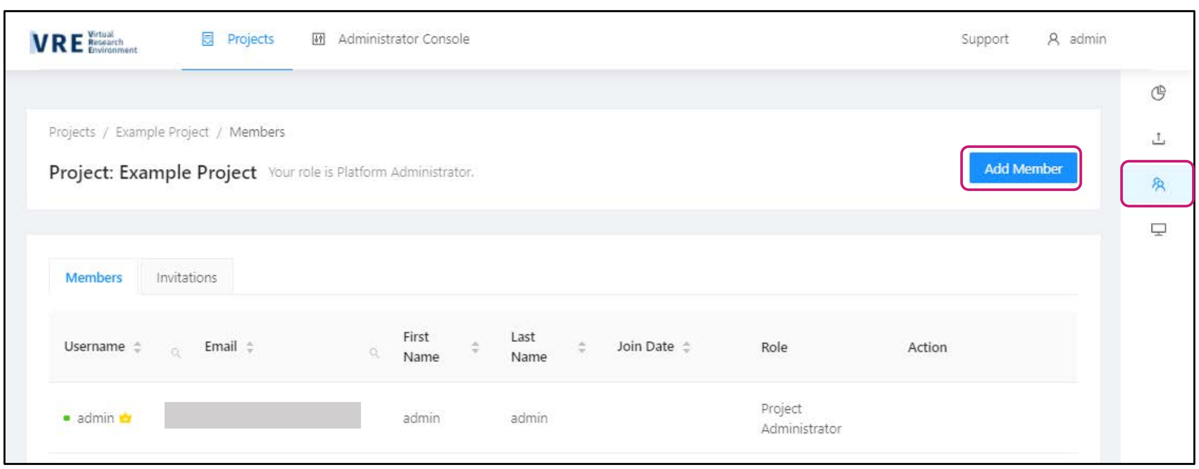
The **Platform Administrator** is a member of the VRE administrative team. The Platform Administrator maintains the Portal and creates Projects in the VRE upon request from a Principal Investigator (PI) and after all appropriate data protection authorizations and data sharing agreements have been secured. The Platform Administrator can perform other administrative functions to assist the Project Administrator with support issues related to their Project.

5.2 User Management for Project Administrators

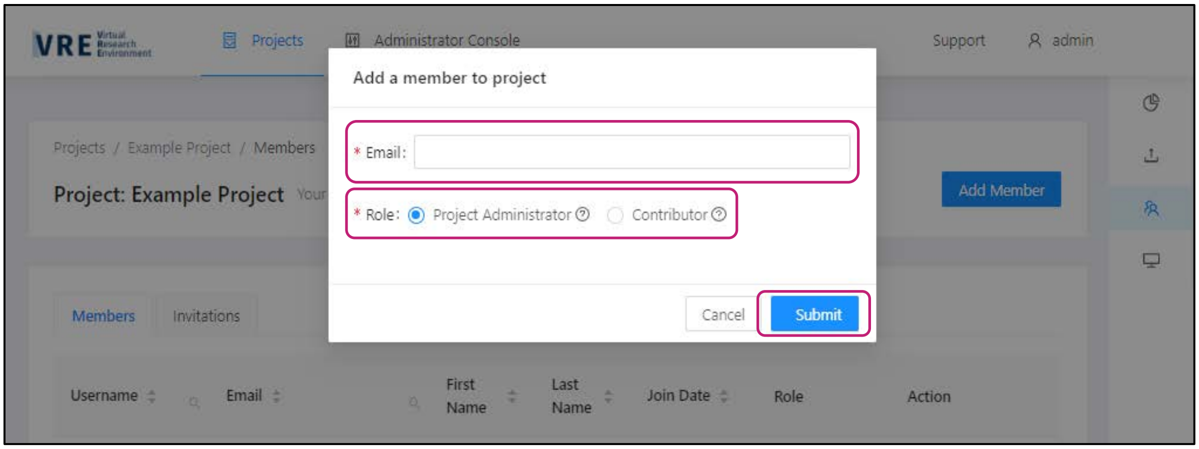
5.2.1 Adding Project Members

Project Administrators may invite members of their research team to collaborate on their Project and may assign their role.

1. Log into the VRE Portal. You must be a Project Administrator in the Project.
2. Select your Project from the Landing Page
3. Click the **Members** icon located in the Right Sidebar
4. Click **Add Member** to open the *Add a member to project* dialogue box



5. Enter the user's institutional email address, select the role for the new user, and click **OK.**



- If the user has already been registered as Member of the VRE platform in one or more other Projects, they will be added to the Project immediately and will be notified by email that their new Project access has been granted.

- If the user has not previously been registered as a Member of a VRE Project, an email will be sent to the Member with instructions on setting up their VRE Account (see Section 5.2.2 Completing the Member Registration Process).

5.2.2 Completing the Member Registration Process

All new users of the VRE will receive a registration email containing information on the name of the Project to which they have been invited, and a registration link. Clicking the link directs the user to a registration page prompting them to provide their user information and to accept the Platform Terms of Use (See Section 2.2 User Account Registration).

Dear VRE member,

John Smith has invited you to the following project:

Project Name: Example Project

Role: Contributor

In order to access the project please visit the link below:

Project Link

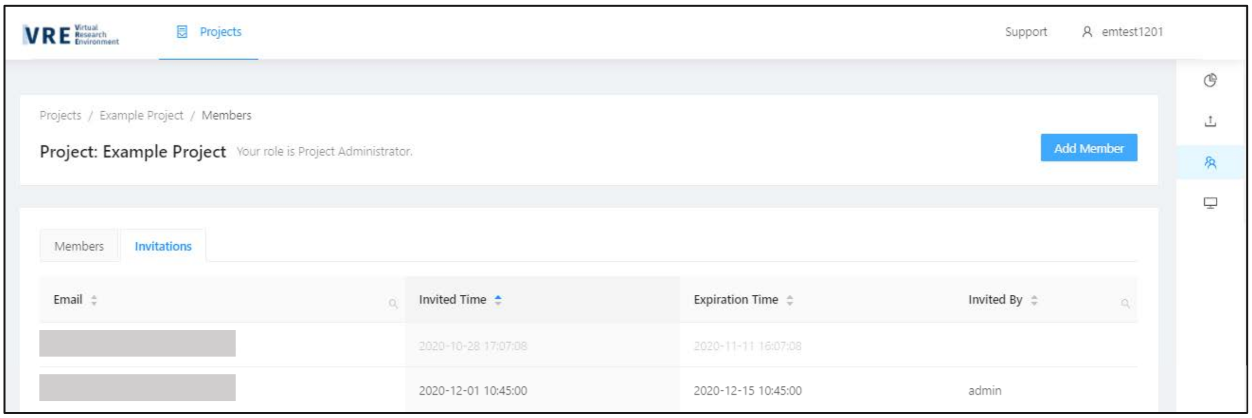
After completing this process, the user can now log in and access the project resources according to their role.

The link is valid for 14 days, or until the registration process is successfully completed, whichever comes first.

5.2.3 Viewing and Re-sending invitations

A Project Administrator may need to re-send an invitation to a user who has lost or deleted the original email invitation or if the invitation link has expired. To re-send an invitation to a user, a new invitation must created by following the steps in Section 5.2.1 Adding Project Members.

To view invitations that have already been sent, navigate to your Project, click the **Members** icon and select the *Invitations* tab. The list of all invitations can be sorted by using the column headers. Invitations with black text are pending (sent but not yet accepted), while invitations displayed in grey text have expired.

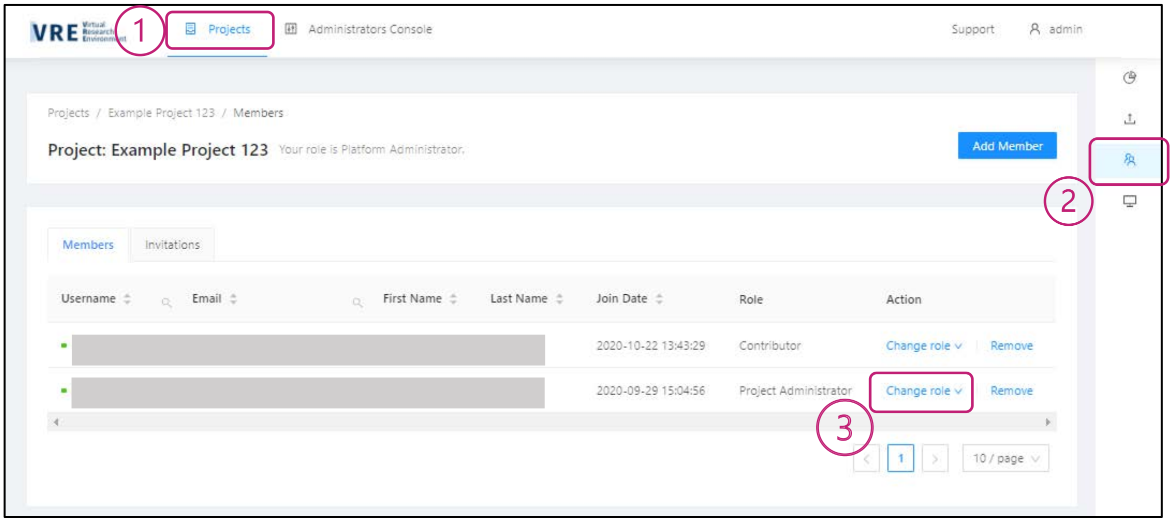


Note: Resending an invitation to a Project will automatically deactivate any previous invitation links sent to a new user.

5.2.4 Updating Member Roles or Removing Members from a Project

Project Administrators may modify a Member's role in their project or remove them from the Project. Start by logging into the VRE Portal as Project Administrator.

1. Select the Project from the Landing Page.
2. Click the **Members** icon located in the Right Sidebar.
3. Locate the member's user account
4. In the *Action* column select **Change role** and choose one of the following options:
    a. Select the new role from the dropdown menu.
    b. Select *delete* to remove the user from the project.

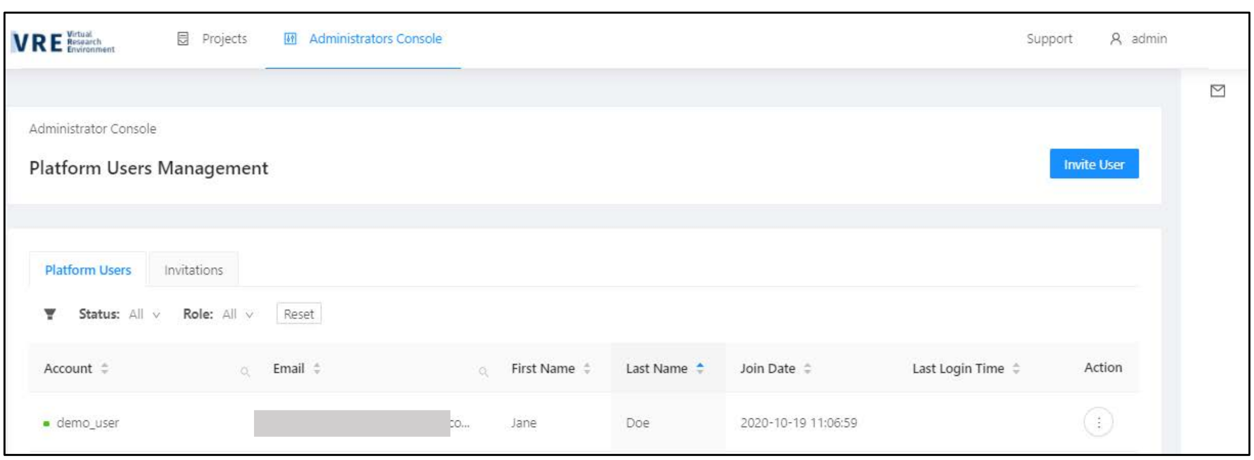


Note: Removing a Member from a Project removes access to all the Project data and resources but does not affect their membership in any other Project. Only a Platform Administrator can remove a user from all Projects.

5.3 Administrator Console

For Platform Administrators only.

The Administrator Console provides Platform Administrators with tools for managing users across the Platform. It is accessed from the main menu of any VRE portal page.



5.3.1 Viewing All User Accounts

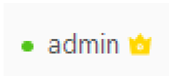
The **Platform Users** tab displays all platform user accounts.

- A coloured circle icon to the left of the username denotes the user's account status:

  Active (Green with black text)

  Disabled (Orange with grey text)

- A yellow crown icon to the right of a username indicates that the user is a Platform Administrator.

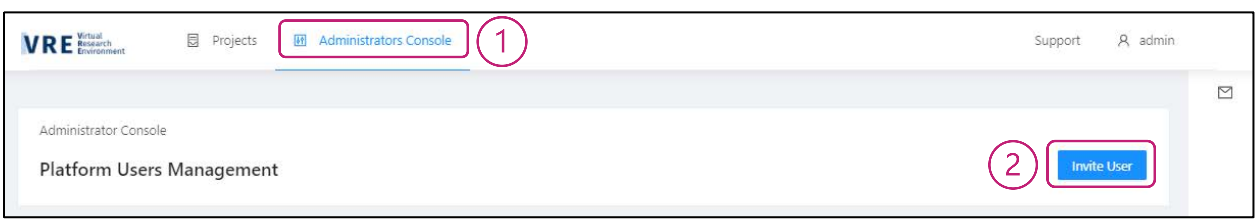
- Use the filters to limit the entries displayed by Status (All, Active or Disabled) or Role.
- To view more information about a user, click the **Action** menu icon and select **Profile**. To send an email to all users click the **Email** icon in the right sidebar.

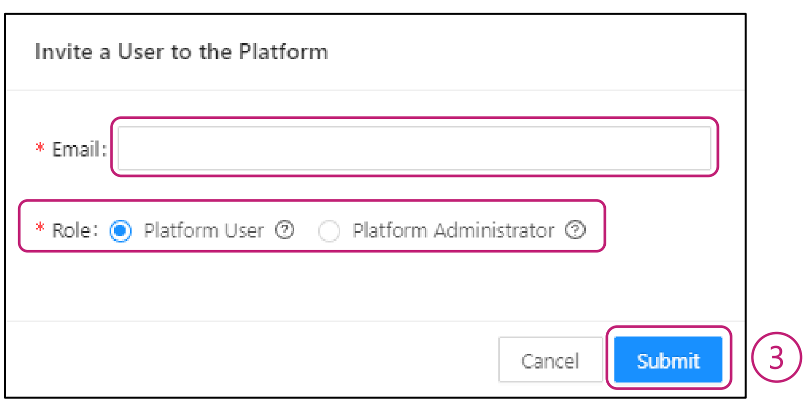
The **Invitations** tab displays all invitations sent, including expired invitations.

5.3.2 Adding Platform Members

A Platform Administrator may invite a new Member to the VRE without assigning them to a specific project.

1. Navigate to the Administrators console in the Main Menu
2. Click the **Invite User** button.
3. Enter the user's institutional email address, select the role for the new user, and click **Submit.**
4. An email will be sent to the user with instructions to register their account on the VRE.





5.3.3 Adding a Project Administrator to a Project

The Platform Administrator invites the first Project Administrator for each Project. This step must be carried out from within an existing Project by following the steps outlined in Section 5.2.1 Adding Project Members.

Once the Project Administrator has registered their account and accessed their project, they can invite additional members to their project.

Note: Uploading real study data is prohibited until the lawful requirements for data processing have been established and approved by applicable data protection authorities, ethics boards and data sharing agreements have been secured for the Project.

5.3.4 Viewing and Re-sending Invitations

To view invitations that have been sent to all users across the platform, click the **Members** icon and select the *Invitations* tab. The list of all invitations can be sorted by using the column headers. Invitations with black text are pending (sent but not yet accepted), while invitations displayed in grey text have expired.

A Platform Administrator may need to re-send an invitation to a user who has lost or deleted the original email invitation or if the invitation link has expired. To re-send an invitation to a user, follow the steps outlined in Section 5.2.1 Adding Project Members to invite users directly into a Project, or Section 5.3.2 Adding Platform Members to invite general members without any specific Project access.

5.3.5 Disabling Platform User Accounts

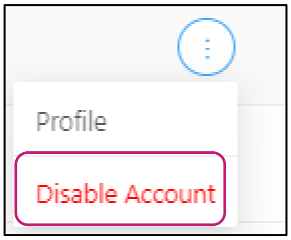
If a VRE user no longer requires access to the VRE or their account has been compromised, a Platform Administrator can use the Administrators Console to disable the User's account. The user whose account has been disabled will be blocked from logging into the VRE and will lose access to all of their projects. Disabling a user account does not delete the user from the platform - all of their platform history and lineage will be retained for audit trail purposes.

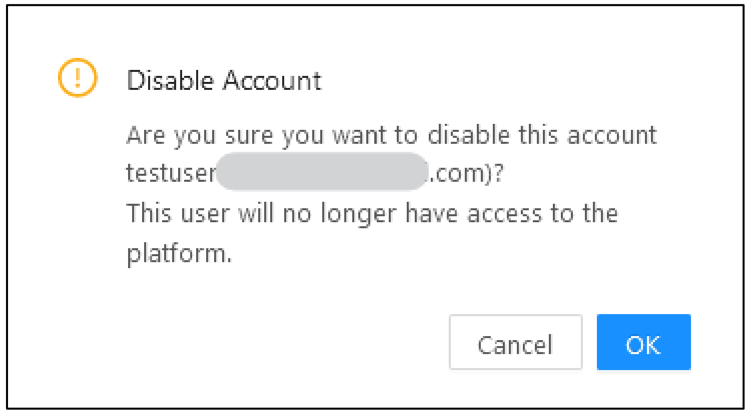
Disabled accounts are visually distinguished in the *Platform Users* list by grey text with an orange circle icon to the right of the username.

To disable a user's account:

1. Navigate to the Administrators console in the Main Menu
2. Click the *Action Menu* ⋮ icon next to the user's name and select **Disable Account**

3. A warning message will appear to confirm the action. Review and confirm the username and email address and click OK to complete the action.

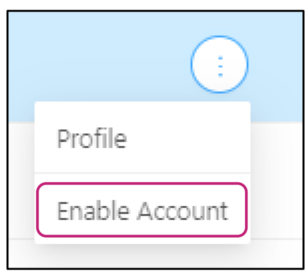




5.3.6 Re-enabling Platform User Accounts

Platform Administrators can re-enable a user's disabled account in the Platform Administration Console. Note that this only restores the user's access to the platform without any project membership; a Project Administrator or Platform Administrator will need to add the user into each of their previously affiliated projects after their account is restored. To re-enable a user's account:

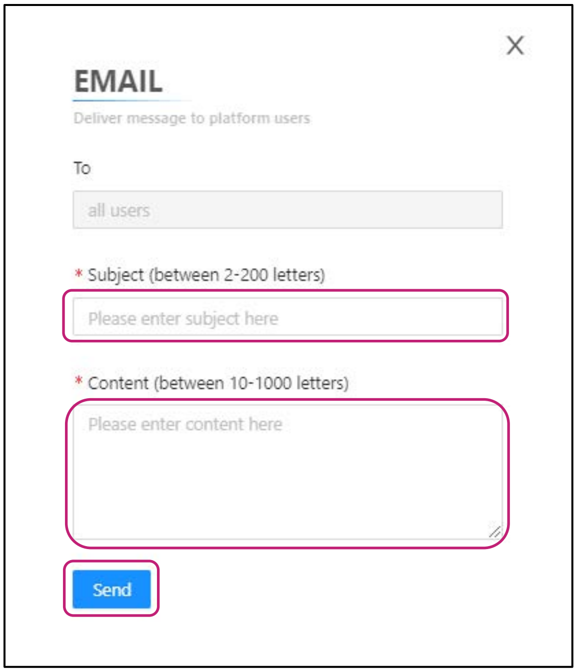
1. Navigate to the Administrators console in the Main Menu
2. Click the *Action Menu* icon next to the user's name and select *Profile*
3. Click **Enable Account** and confirm.



5.3.7 Platform Member Communication

Platform Administrators can send bulk emails to all VRE members from the Administrators Console. To send an email to all platform members:

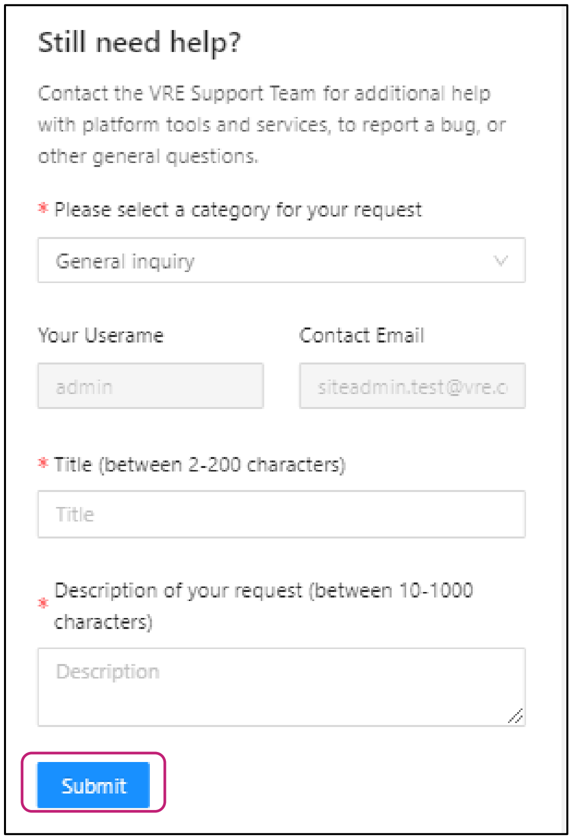
1. Navigate to the Administrators console in the Main Menu
2. Click the **Email** ✉ icon in the right sidebar
3. Enter the email *Subject* and *Content*
4. Click **Send**



6 Support

Support resources can be accessed from any page of the VRE Portal, regardless of whether you are logged into a Project.

1. From the Main Menu, click **Support**, to open a sidebar with support resources.
2. Download the User Guide to review detailed information about the VRE.
3. Review **Frequently asked questions** to see if information is already available on the issue you are experiencing.
4. If you cannot find a solution, scroll down to the **Still need help?** to initiate a support inquiry.



5. Complete the required fields to provide details on your support inquiry and click **Submit**. A member of the VRE Support Team will connect with you to resolve your issue.

Note: If you are unable to log into your account or access the Support page, you can contact a Service Desk agent directly by sending email to: vre-support@charite.de

7 Change Log

Version	Date	Updates
0.1.0	October 20, 2020	Initial Version
0.1.1	October 28, 2020	Updated features for Release 0.1.1; Updated text and screenshots for clarity; Added Change Log.
0.2.0	November 30, 2020	Updated features for Release 0.2.0: Enhanced file tagging & annotation; Data lineage graph; Search project attributes; Platform Administrators user management console, Search Panel and Properties Side Panel. Updated URL to include "/vre" extension. Revised content for clarity and flow.