



Guide to milliways.online version 20.04 (draft)

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Credits

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Welcome to milliways.online, a data room for contacts, documents, plans, contracts, procedures, agreements - in short for all the information we have to share in order to operate, plan and build together. As a Common Data Environment (CDE) milliways.online creates a collaborative work space and a secure place to process, manage and archive large datasets over the life cycle of an asset. milliways.online is open source and free of charge. Its concept allows full self-administration by its user. The user interface and the back-end database is fully modifiable at any time. Our vision is to enable you with a simple and uncomplicated entry into the digitization of the value chain of construction industry and facility management.

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1. Introduction

1.1. Common Data Environment

In December 2018 and January 2019, the International Standard Organization (ISO) and the European Committee for Standardization (CEN) published the Framework Directive EN ISO 19650 for Information Management in Building Information Modelling (BIM). Since then, contracts based on this standard have stipulated that a Common Data Environment (CDE) must be established for each planning and construction project. In this common data environment, the project is to be created, started, planned and then the building is to be operated as an asset. According to EN ISO 19650, each project or asset is assigned to a single CDE. However, an architect, client or asset manager will often work on more than one project. He will therefore need a data environment in which several projects are located. milliways.online provides just such an environment. Strictly speaking, it is rather a CDE space - a space for several CDEs. It has a link layer that mediates between the projects if the same addresses or documents are needed in several projects.

1.2. Why Open Source?

milliways is designed from the very basics as an open system. It consists of hardware and software components that use the Internet and its free systems to enable communication from all possible locations. The milliways system consists of servers that can be installed as hardware in almost any location. It also consists of open source software, which is either already available as open source (e.g. the operating system Linux), or was developed by the milliways team and is available to the general public under the open license of Creative Commons (CC-BY-NC-SA 3.0). milliways is freely scalable as a cloud system. It is based on proven IT technologies: on the Internet and its protocols as a network, on the family of UNIX operating systems, on the open server systems Apache, MariaDB, ProFTPD and PHP. Added to this is a code that has matured over years of practical experience. In the new version 19.01, the user interface has been adapted with much effort to the real needs of the newcomer. It changes from the purely functional, technical "database jack-of-all-trades" of milliways 1.0 to a modern and fast communication center - visible for the first time in the now available development version milliways 19.01.

1.3. Build your own cloud

The phrase "build your own cloud" stands for the possibility of becoming independent of licence fees and large IT companies as commercial data collectors. milliways.online should enable small and medium-sized enterprises and market participants to do their work and to remain masters of their data. milliways.online gives them back the power over their data and thus also provides a piece of data security in the sense of the General Data Protection Regulation (GDPR). milliways is your "cloud" - physically and organizationally.

1.4. Development of milliways

milliways.online was first created when in 2014 a group of engineers from Baden-Württemberg received a major order as general planners in the Middle East. This could only be handled reasonably with a central data platform. The task was to network offices in Germany, Egypt and Saudi Arabia via the Internet. A first approach with a simple "cloud" solution available on the market was doomed to failure after two weeks. The data security and functionality of this "cloud" was too low. However, a professional solution was far out of budget.

A solution was found by using some program modules that had already been developed privately. After a short but intensive adaptation work and the leasing of a server space in a local data center with a very fast network connection, a system was available that was suitable for the requirements of order processing.

The individual software components of this first milliway were created and distributed as open source code. Thus they were also continued in the further development for the general planning contract with this philosophy. After all, the first milliways was a means to an end and had no product intentions of its own.

As a result, milliways grew immensely. Many new components were developed. The Unix principle "Do it small and simple, build your work on top of others and don't do it twice" developed into the milliways development philosophy. The entire "zoo" of milliways software applications can still be found today in the milliways 1.0 installation.

In 2018 milliways was installed at different locations and was used in more and more projects. milliways had developed into a "product" for which there was no marketing, no distribution and no regulated production. But there was market demand.

Due to the international standardization in digitalization in the construction industry, it now became clear that milliways was ahead of its time. It was a complete

Common Data Environment (CDE) when this term was introduced in 2018 with the publication of EN ISO 19650. Thanks to the managing director of the original initiator, the Consortium of Baden-Württemberg Engineers (bw-engineers.com), an application for funding was submitted to the Baden-Württemberg Ministry of Economics. The project "BIM Open Source" (BIM-OS) was approved. The fundamentally new edition of the milliways programming code began in November 2018. The code was adapted to the requirements of the European General Data Protection Regulation (GDPR). A training program was developed and a small but fine developer community was established.

milliways and all its by-products (e.g. documentations) are licensed under the Creative Commons BY-SA-NC 3.0 "Gemeinfreiheit" (common freedom) license system. milliways can thus be freely used, copied and further developed by anyone (Non Commercial - NC). Further developments based on milliways must comply with this principle (Share alike - SA). In order for this to be visible, they must indicate the origin (Attribution - BY).

2. The way to milliways

sources: milliways.online will supply the link to the current version..

milliways is a system that needs to be set up in terms of hard- and software. Once set up, the first user can start to use the system.

NOTE: The milliways code is designed to run multiple milliways domains at the same hardware (base server). This is to provide the possibility to run several “milliways” on the same hardware without having to invest in hardware specifically any time you want to establish a new CDE Space.

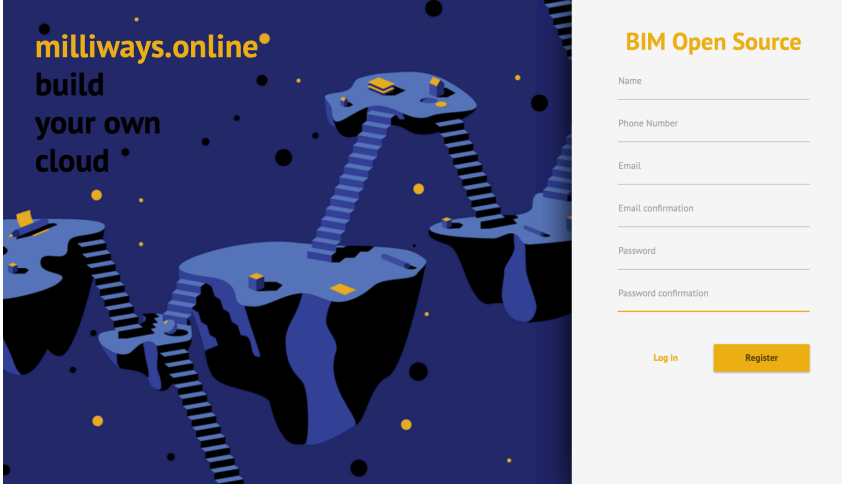
Each of these “instances” is called a virtual server in “installation”-speak or CDE-Space in “user”-language. Each of them has its own database, data room and user interface. Each virtual server/CDE Space is technically standalone and can not make use of the data of another one. Only the hardware administrator can access each server on the operating system level.

This first user will be the first administrator of its milliways system. The following table describes these steps in detail for one virtual server / CDE Space.

seq	process step	responsible	result	credentials
1	installation of base server in hard- and software	base server admin	running operating system (CentOs 7 recommended) with ssh access to internet	ssh access by IP of base server
2	installation of virtual domains	base server admin	accessibility of web services	A-record at domain hoster pointing to base server
3	installation of milliways servers	base server admin	running milliways web services under PHP, running database services accessible by the web services	various server and folder access rights
4	installation of CDE Space admin account	base server admin	1st contact entry in milliways database of selected virtual domain / CDE Space	CDE Space admin login and password
5	hand over to CDE Space admin	base server admin CDE space admin	1st accessibility to selected milliways CDE Space by CDE space admin	change of initial CDE Space admin login and password
6	setting up projects and inviting other space users	CDE Space admin	further accessibility of other users to CDE Space	ongoing access rights entries of CDE Space users in contacts

2.1. Registration

Register yourself at milliways.online.

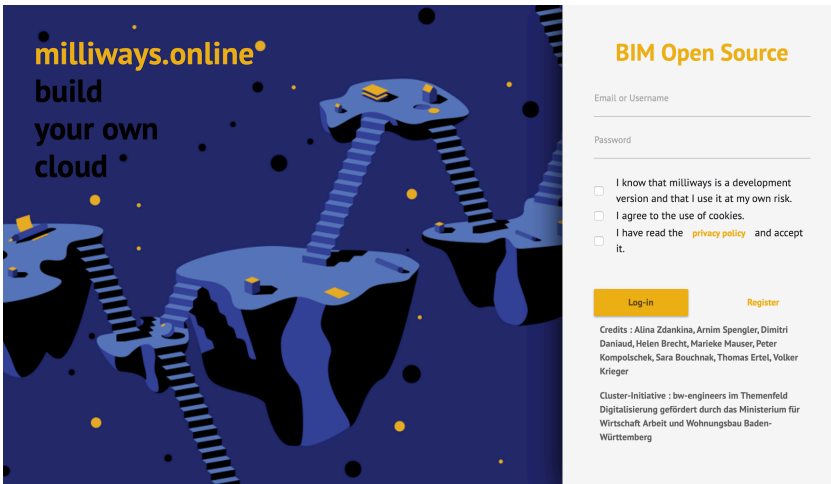


The image shows the registration page for milliways.online. On the left is a dark blue banner with the text "milliways.online° build your own cloud" and a stylized illustration of floating islands connected by staircases. On the right is a white form titled "BIM Open Source". The form contains input fields for Name, Phone Number, Email, Email confirmation, Password, and Password confirmation. At the bottom of the form are two buttons: "Log in" and "Register".

2.2. Log in

If you have registered yourself, you can apply with your email address and your password.

Do not forget to tick the three check-boxes!



The image shows the login page for milliways.online. On the left is the same dark blue banner as in the registration page. On the right is a white form titled "BIM Open Source". The form contains input fields for "Email or Username" and "Password". Below these fields are three checkboxes with the following text: "I know that milliways is a development version and that I use it at my own risk.", "I agree to the use of cookies.", and "I have read the [privacy policy](#) and accept it." Below the checkboxes are two buttons: "Log-in" and "Register". At the bottom of the form, there is a "Credits" section listing the names of the developers and a "Cluster-initiative" section mentioning the support from the Ministry of Economic Affairs and Housing of Baden-Württemberg.

3. The “Front-End” of milliways

The Front-End of milliways is a Graphical User Interface (GUI).

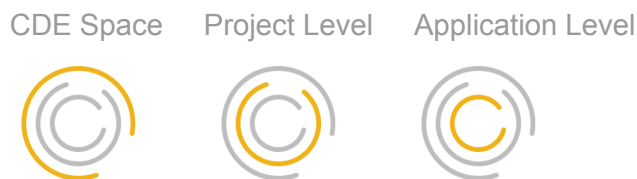
To build the Back-Ends look at: [Code Manual](#)

The Frontend consists of four levels:

1. CDE Space
2. Project Level
3. Application Level
4. Dataset Level

The logo symbolize the first three levels as an access path to the data.

conceived as a dynamical logo, it shows the current working position (inactive in 19.01)



3.1. Header

The Header stays unmodified on all levels

Elements of the Header:



Logo:

- Homebutton
- Dynamical Logo, position indicator (inactive in 19.01)



Company Logo (inactive in 19.01)

- Everyone can place his/her Logo



Search (inactive in 19.01)

- Fast access on documents



User profile (inactive in 19.01)

- Specific information of the user
- Can be assumed as an address dataset



Settings

- My Account (will be set as a user profile)
- Milliway's Guide (brief instruction to Milliways)
- About: BIM Open Source Initiative (inactive in 19.01)
- Log out

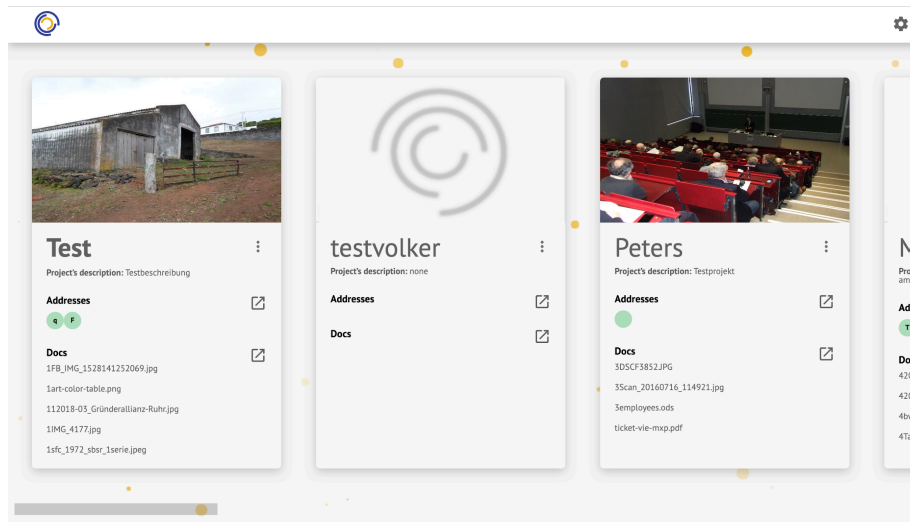
Navigation Bar (under the Header)

- shows your actual position

CDE Space > Project A > Adresses

3.2. CDE Space Level

The CDE Space is the room of projects (CDEs). The CDE Space serves as a Dashboard. Consists of: project types



as at 27.03.19

Elements of the CDE Space



Create a new project (Look at 4.1. Create a new project)

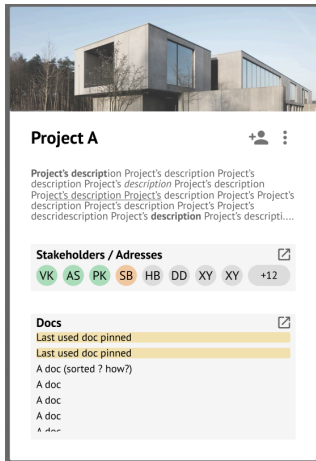


Archived projects (inactive in 19.01)

3.2.1. Projektmap

(sorted by creation date)

Option to sort after other criteria (inactive in 19.01)



Project image

Project name

Project description

Addresses (App 1)

- Shortcut to address app

Docs (App 2) last used

-Shortcut to doc app

Functions:

+ Invite new members (look at [4.1.3.](#)) (inactive in 19.01)

Menu

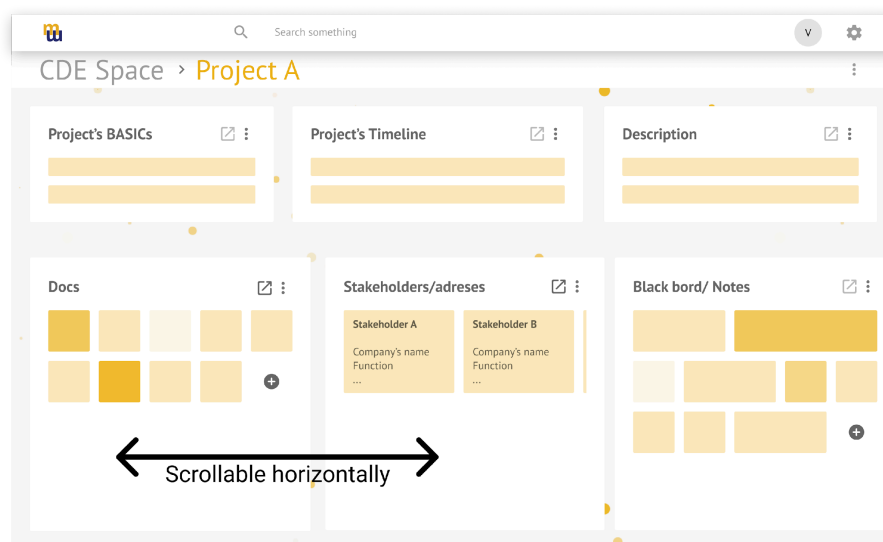
- Update a project / edit project information
- Archive a project (inactive in 19.01)

3.3. Project Level (inactive in 19.01)

The Project Level is the dashboard of each individual project (CDEs)

The Projekt Level is splitted in two zones:

- At the top: Projekt zone (Projekt Meta Data): basics, timeline and news
- At the bottom: Projekt Application Zone: docs, addresses + other Apps



Fixed Elements:

Project Basics
Project Timeline
Project Description

Mobile Elements:

Applications
Docs/Addresses/
Notes/ +

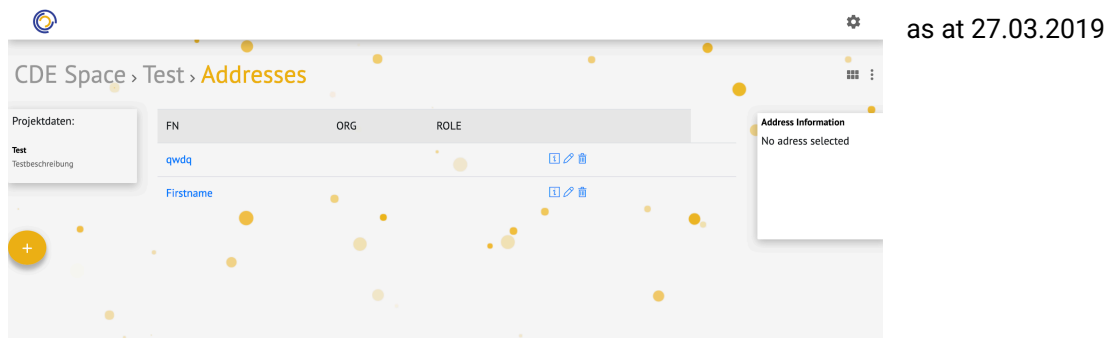
to the App-Level

3.4. Applications Level

Detailed view of the applications (These days: Addresses/Docs)

3.4.1. Address Application

With the Address Application you can manage the addresses and link with every arbitrary dataset. (inactive in 19.01)



Elements of the Address Application

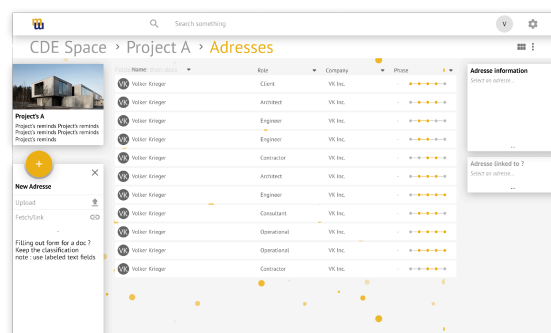
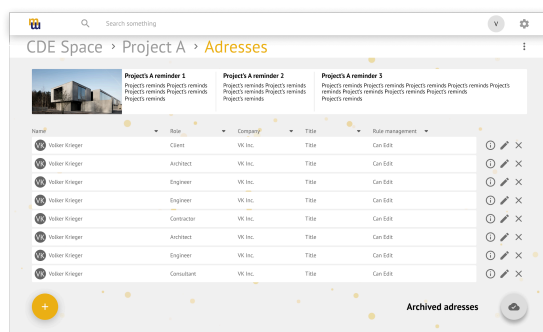
- Address Table
Basic information per contact: Name/Role/Title/Competence
which information are shown is modifiable (inactive in 19.01)
- Address Information
shows the whole data set of an address, if it is selected. To select click in the line of the table.
- Project Basics
Basic informations of the project



Create a new address data set (look at [4.3.1.1](#))

Visions
for 19.01

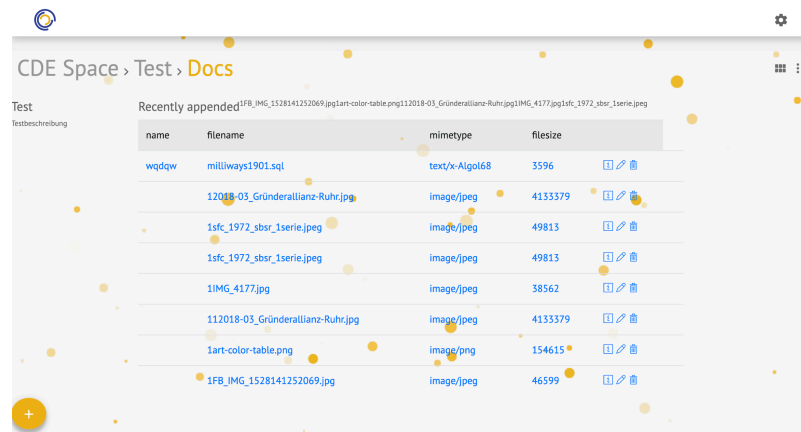
for 19.04



3.4.2 Docs Application

With the Docs Application you are able to upload, share, manage files, edit some data in common and link it to any other data set.

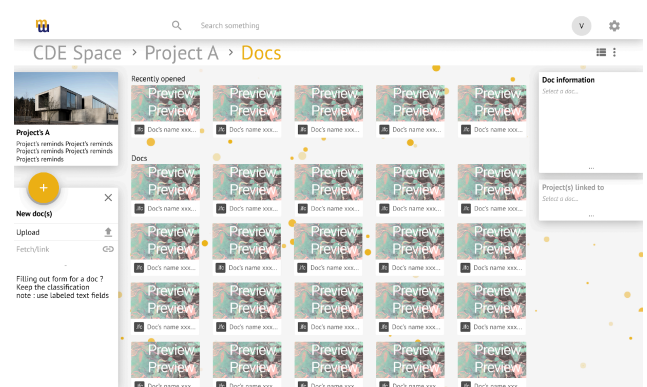
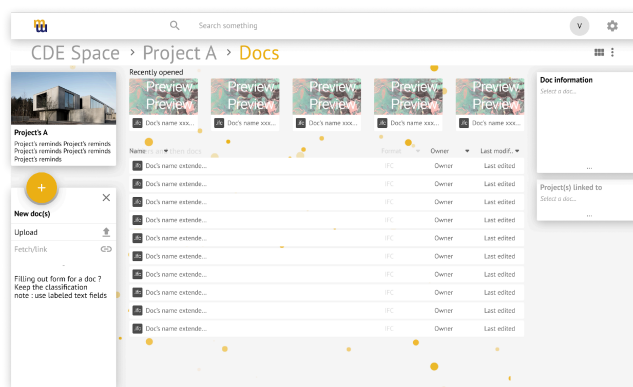
Elements of the Doc App



Project's Basics
Last used Documents
Document tables/ plans
- Download by click

Upload and classify a new document (look at [4.3.2.1.](#))

Visions:

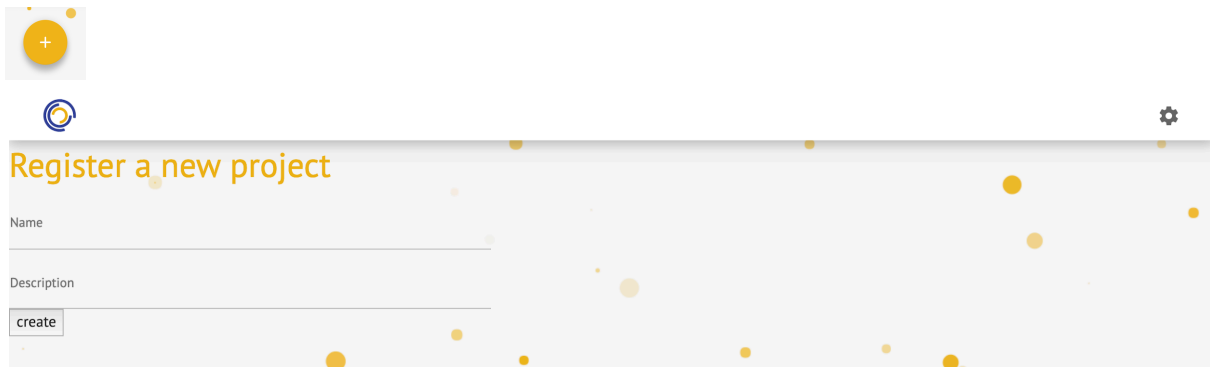


4. Workflow.

4.1. Workflow in the CDE Space

4.1.1. Create a new project

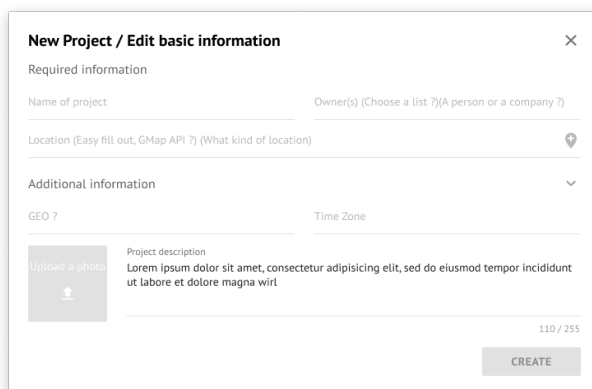
- Go to CDE Space
choose:



- Name your project
- Add a project description
- Transact the process with CREATE

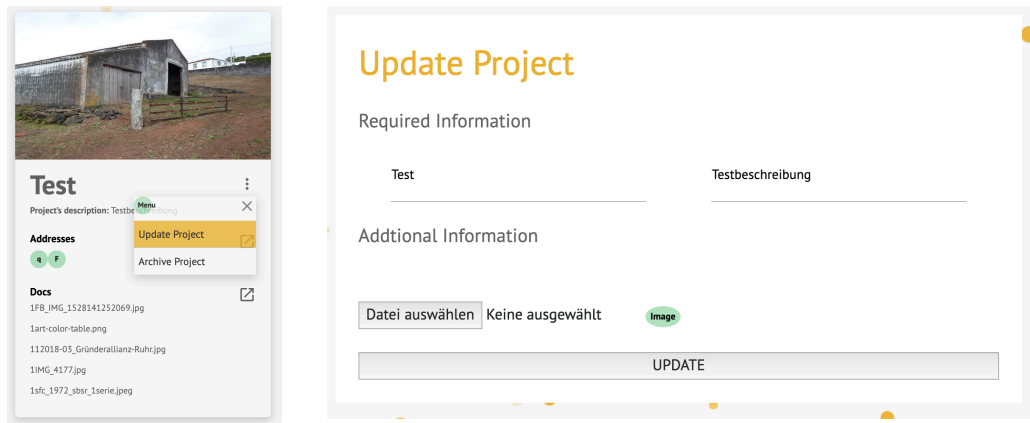
> Your project appears as a project map in the CDE Space

Vision:




4.1.2. Update your project data

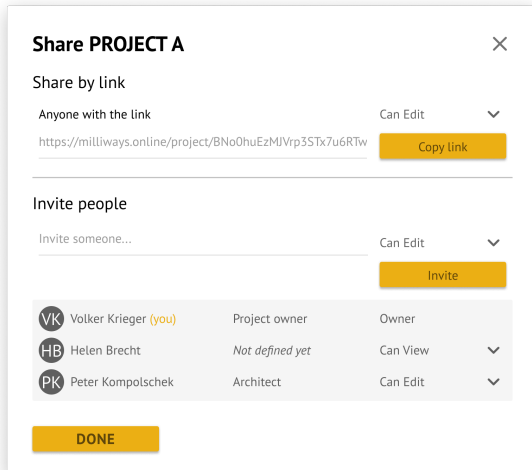
- Go to CDE Space
- Select UPDATE PROJECT in the menu of your project space



- Add/Edit the desired informations and confirm with UPDATE
Detailinformationens of the projekt like Owner Location, Time Zone, etc. will be added (*inactive in 19.01*)

4.1.3. Invite employees (inactive in 19.01)

- Go to CDE SPACE
- Choose on your projectmap: 



- You can invite your employees directly, if they already are a part of the community
- Determine which Employee has which rights (Can view/Can edit)
- Delete employees (for the admin)

4.1.4. Change the structure of your CDE (inactive in 19.01)

- Go to CDE Space
- Choose at the menu of your projectmap:
Complete CDE/ Deleting CDE/ Hide a CDE / Tranfer the CDE to the archiv

4.2. Workflow in the Project Level

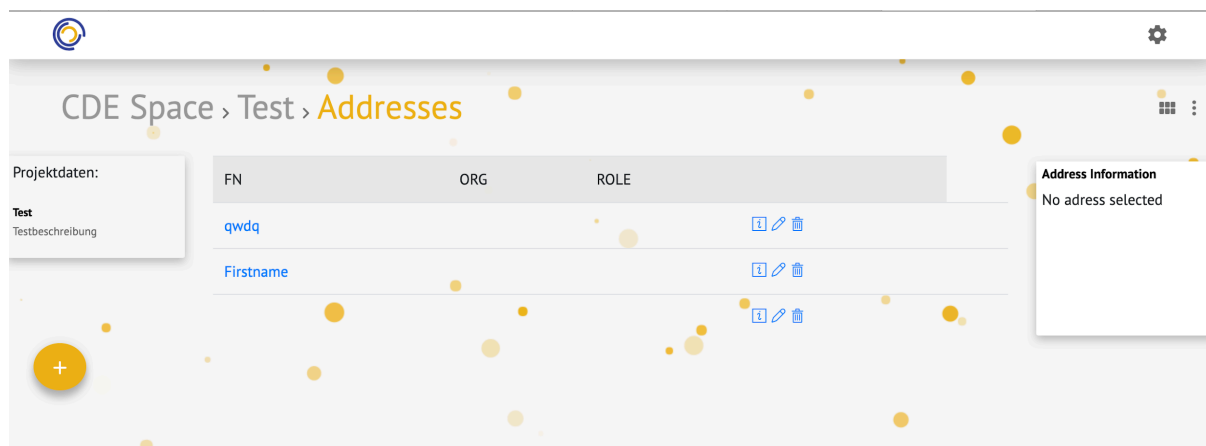
4.2.1. Organize your project (inactive in 19.01)

The Project Level is used for the structuring and organization of the project.

4.3. Workflow in the Application Level

4.3.1. Workflow in the Address Application

- Go to Address Application. Click on ADDRESSES in your projectmap.



4.3.1.1. Create a new Address Data set

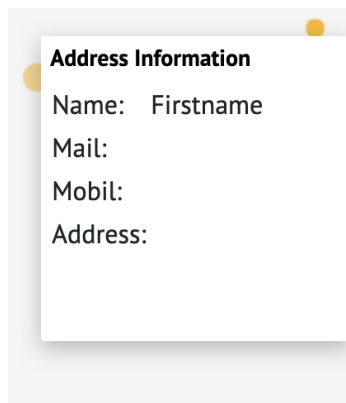
- Choose:




- Fill in these informations
- Confirm with CREATE

4.3.1.2. Show an Address Data set

- In the table you have to choose the address, of which you want to have shown more informations
- The whole data set appears at ADDRESS INFORMATION



Vision: Integration of the detailed informations inside the table structure in an expanded window

FL	FirstName LastName	Architect	VK Inc.	Title
	Organisation Information		Personal Information	
	Name of organisation		Gender ?	
	Adresse PostBox		Date of birth	
	Email		Adress	
	T1		Phone	
	T2		Mobil	
	Fax		Fax	
	Home Page		Email	
			Home Page	

4.3.1.3. Edit an address data set

- You can edit an address, by choosing the line of the respective address with the Edit-Button
- You can delete an address, by choosing the line of the respective address with the Delete-Button

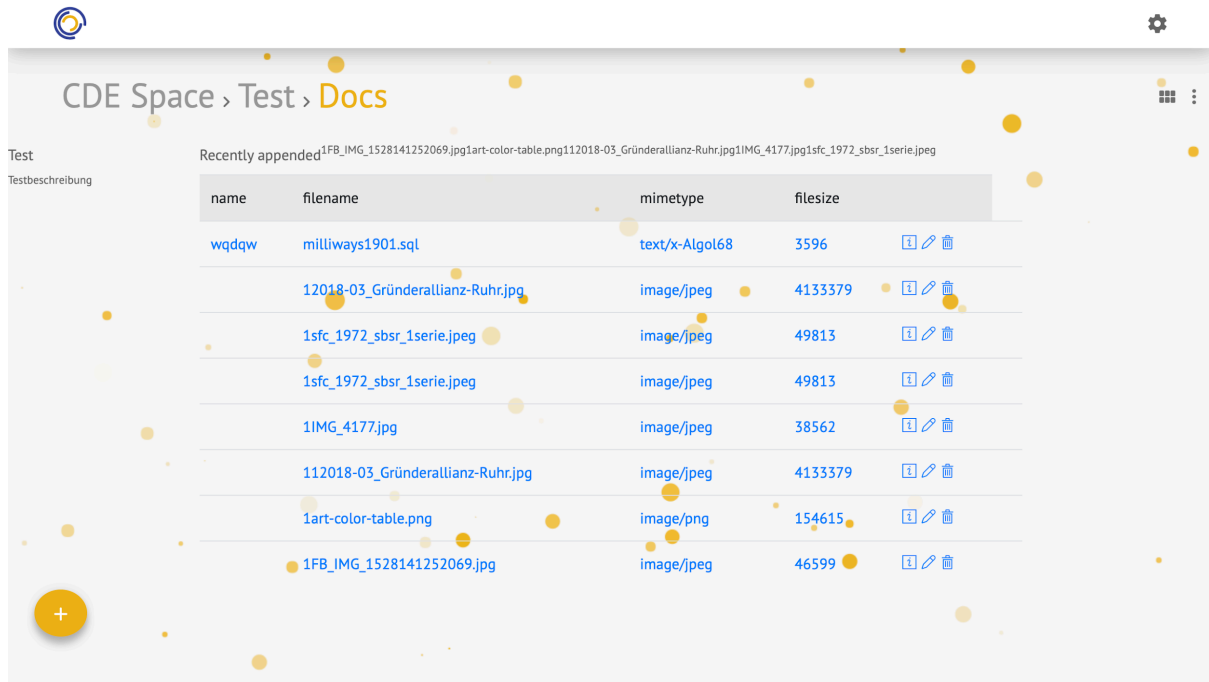
4.3.1.4. Connect an address data set (inactive in 19.01)

- You are able to connect any address with another data set

4.3.1.5. Download a data set or a list (inactive in 19.01)

4.3.2. Workflow in the Document Application

- Geo to the document application. Click on DOC in your projectmap in the CDE Space



4.3.2.1. Upload a document

- Choose:



- Choose your project
- choose your document
- Categorize your document (Type/Category/Storage mode)
- Submit with SEND

! A proper classification of documents is essential for the organization of the database

The screenshot shows a 'New Address' form with the following fields and options:

- Project: Test (dropdown)
- Name: (text input)
- Original Filename: Datei auswählen / Keine Datei ausgewählt (radio buttons)
- Type: none (dropdown)
- Category: none (dropdown)
- Storage mode: none (dropdown)
- Senden (orange button)

4.3.2.2. Show a document (inactive in 19.01)

4.3.2.3. Download a document

- Click on the FILNAMEN in the table
The document will be downloaded automatically.

4.3.2.4. Collective work in the document (inactive in 19.01)

4.3.2.5. Connecting of a document (inactive in 19.01)

- You are able to connect a project with any other data set