

Pointly

User Guide

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1. Getting started with Pointly

Pointly is a cloud-based SaaS solution allowing to manage and classify 3D point clouds. It enables an accelerated manual classification of data points within point clouds using innovative artificial intelligence (AI) techniques.

1.1. System requirements

To use Pointly, all you need is internet access and a browser. Below you can find some recommendations for a better experience.

- To upload large point clouds, a fast upload connection is beneficial.
- Pointly is using the open source Potree Viewer (<https://potree.github.io/>) to visualize point clouds efficiently in the web browser. For a smooth experience while working with big files we recommend a device with a GPU.
- Even though other browsers are supported, we recommend using Google Chrome.
- You can simply create a [Free Account](#) to test performance on your system.
- In case the performance is not as expected, try lowering the point budget in the viewer settings, as described in [Viewer Settings in Pointly](#).

1.2. Account types

Pointly offers two types of accounts – Free and Professional. The Free Account allows the user to upload three (3) point clouds with maximum 15 MPoints, and exporting point clouds is unavailable for Free Accounts. The Professional Account offers access to all Pointly Features and enables the creation of an unlimited number of projects. The storage capacity depends on the type of the Professional Account (S, M, Enterprise). Monthly, quarterly or yearly payment plans are also available, allowing you to receive attractive discounts on quarterly and yearly payment. The Annotator Account only has access to Projects shared by a Professional Account. Within a shared project an Annotator can classify points within the point clouds, add Tags and create

exports but cannot upload or delete any point clouds.

Monthly	Quarterly (7.5% Discount)	Yearly (15% Discount)	
<p>Professional S</p> <p>99 € per month*</p> <ul style="list-style-type: none"> ✓ All Pointly Features ✓ Unlimited Projects ✓ 500 MPoints Storage equals ~ 12 GB LAS <p>GET PROFESSIONAL S</p>	<p>Professional M</p> <p>490 € per month*</p> <ul style="list-style-type: none"> ✓ All Pointly Features ✓ Unlimited Projects ✓ 5.000 MPoints Storage equals ~ 125 GB LAS <p>GET PROFESSIONAL M</p>	<p>Enterprise</p> <p>Contact Us</p> <ul style="list-style-type: none"> ✓ All Pointly Features ✓ Unlimited Projects ✓ Variable Storage <p>Best for large projects</p> <p>GET QUOTE</p>	<p>Annotator</p> <p>49 € per month*</p> <ul style="list-style-type: none"> ✓ Access to shared Projects ✓ Classify, review and export <p>! Only in combination with a Professional Account</p> <p>GET ANNOTATOR</p>

1.2.1. Project sharing and collaboration with multiple users

Applies to:
Professional + Annotator Account

With the Multi-User functionalities in Pointly, you can work together with multiple users simultaneously on projects and the point clouds contained in them. By working in parallel within a Multi-User project, you can manage the classification process and introduce quality assurance workflows. To ensure that no one is working on the same point cloud at the same time, you will find an Editor Mode. For more details about project sharing see [Section 12](#).

1.3. Sign-Up

In order to create a Free Account, you can either visit the website <https://pointly.ai/#freeaccount> or click on the button „Log In“ placed on the right side of the horizontal navigation bar. After being redirected to the sign-in website, choose the option „Sign up now“ and fill out all the mandatory fields.

POINTLY Services Knowledge Base ▾ Pricing LOG IN

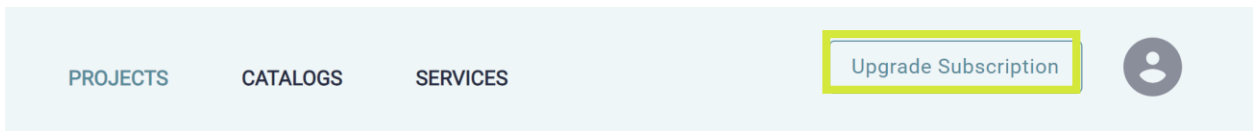


Sign in with your existing account

[Forgot your password?](#)

Don't have an account? [Sign up now](#)

If you are interested in a Professional Account, click the "Upgrade Subscription" button.



There you will see the list of available payment plans. You can enable data sharing which will help training AI models for a 5% discount.

You also get a discount by choosing a quarterly (7,5%) or a yearly (15%) payment.

MONTHLY QUARTERLY (7.5% DISCOUNT) YEARLY (15% DISCOUNT)

Professional S	Professional M	Enterprise	Annotator
99 € per month*	490 € per month*	Contact Us	49 € per month*
<ul style="list-style-type: none"> ✓ All Pointly Features ✓ Unlimited Projects ✓ 500 MPoints Storage ✓ Approximately 12 GB LAS 	<ul style="list-style-type: none"> ✓ All Pointly Features ✓ Unlimited Projects ✓ 5.000 MPoints Storage ✓ Approximately 125 GB LAS 	<ul style="list-style-type: none"> ✓ Custom Classifier ✓ Advanced Support ✓ Variable Storage ✓ Best for Large Projects 	<ul style="list-style-type: none"> ✓ Access to Shared Projects ✓ Manual Classification ✓ Vector Modeling Tools ✓ Review and Export
<input type="button" value="Subscribe"/>	<input type="button" value="Subscribe"/>	<input type="button" value="Get Quote"/>	<input type="button" value="Subscribe"/>

Enable data sharing for a 5% discount

*All prices excl. taxes, all offers shown are intended for companies
 1 MPoint = 1,000,000 points
 Every month the point cloud upload is limited to the storage size (e.g., for Professional S with 500 MPoints storage, every month up to 500 MPoints of new data can be uploaded)
 Please note that any existing active subscription will be superseded by a new one

To proceed with upgrading the account, click Subscribe. You will be redirected to a page where you can enter your payment details and upgrade your subscription.

After successful payment, you can go back to the Pointly platform and use your new Professional account.

1.4. Payment and Account Limits

The Free Account is free of charge.

For the paid accounts payment is due at the same date every month. If you complete your monthly subscription on August 25, the next payment is due on September 25. Once the access to your Professional Account expires, the account will be downgraded to the free version. If your subscription is cancelled and you do not renew it in 30 days, please be aware that your point clouds may be deleted from Pointly.

You can delete files and upload new ones up to the maximum storage capacity of your Professional Account. Every month a maximum number of new files equal to the storage size can be uploaded. This means for a Professional M Account with 5,000 MPoints of Storage, up to 5,000 MPoints of new files can be uploaded every month.

1.5. Security

Pointly is hosted on Microsoft Azure which encrypts storage containers by default with 256-bit AES encryption. It is one of the safest encryption standards and meets the FIPS 140-2 standard for US-Governmental data. All your point clouds and associated data is secured with this encryption. Additionally, our user management builds on Azure Key Vault and ensures that you have complete control over who can access your point clouds. While using Pointly, all communication is run through an encrypted HTTPS connection.

2. Point cloud preparation before uploading to Pointly

2.1. Supported formats

Pointly supports point clouds with the LAS and LAZ format. For faster uploads we recommend using the LAZ format due to its better compression.

2.2. Conversion to las/laz from other formats

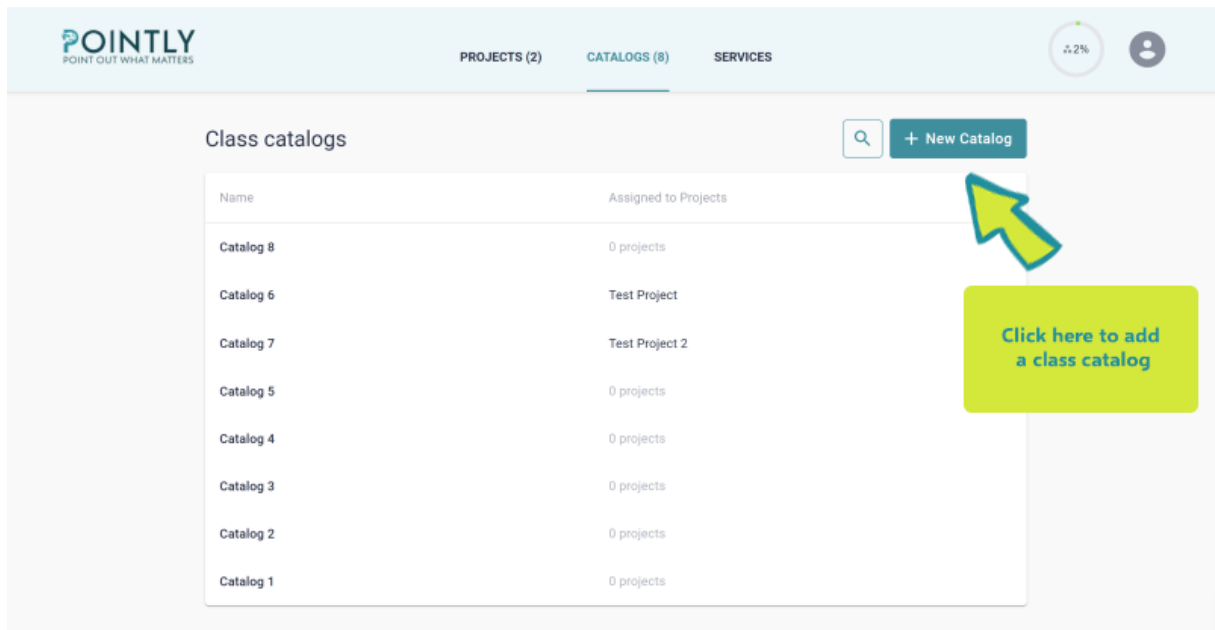
If you want to know how to convert your point clouds to las. or laz. format, check out [our blog article](#) or download [our infographic](#).

3. Class catalogs and projects

3.1. Class catalogs

A class catalog is a collection of all the classes (labels) that are needed for a classification project and are attached to your project. For instance, every lidar point can have a label assigned to it that defines the type of object that has reflected the laser pulse.

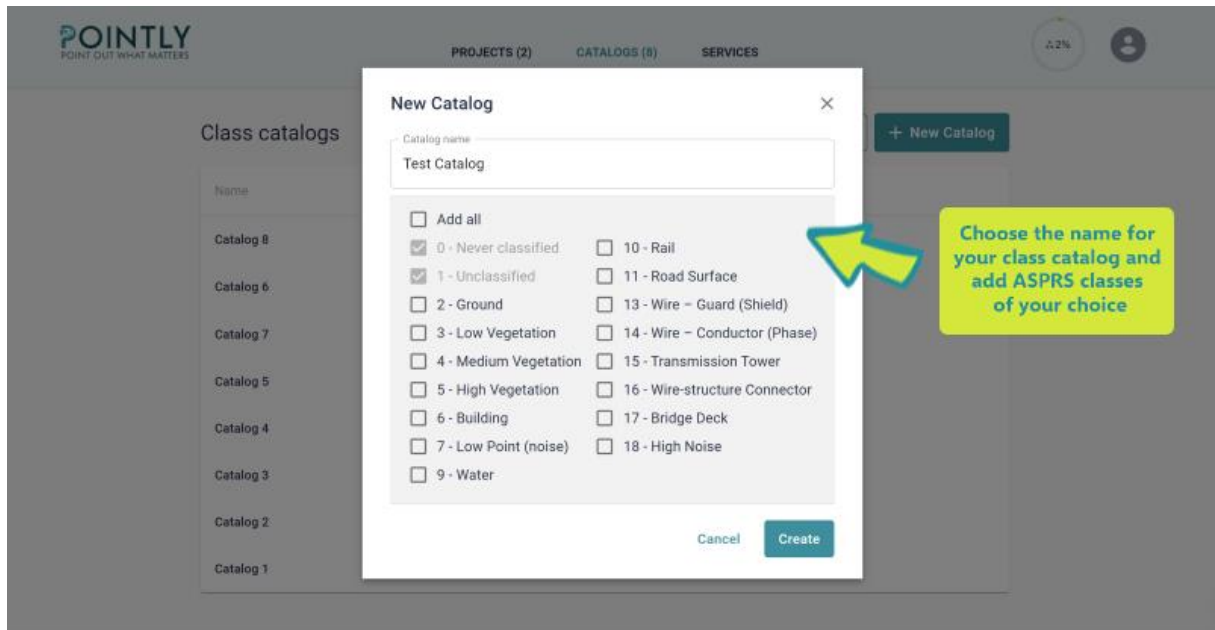
In Pointly, you can customize these catalogs and classes. To **create a class catalog**, go to „Catalogs“ and choose the green button “+ New Catalog”.



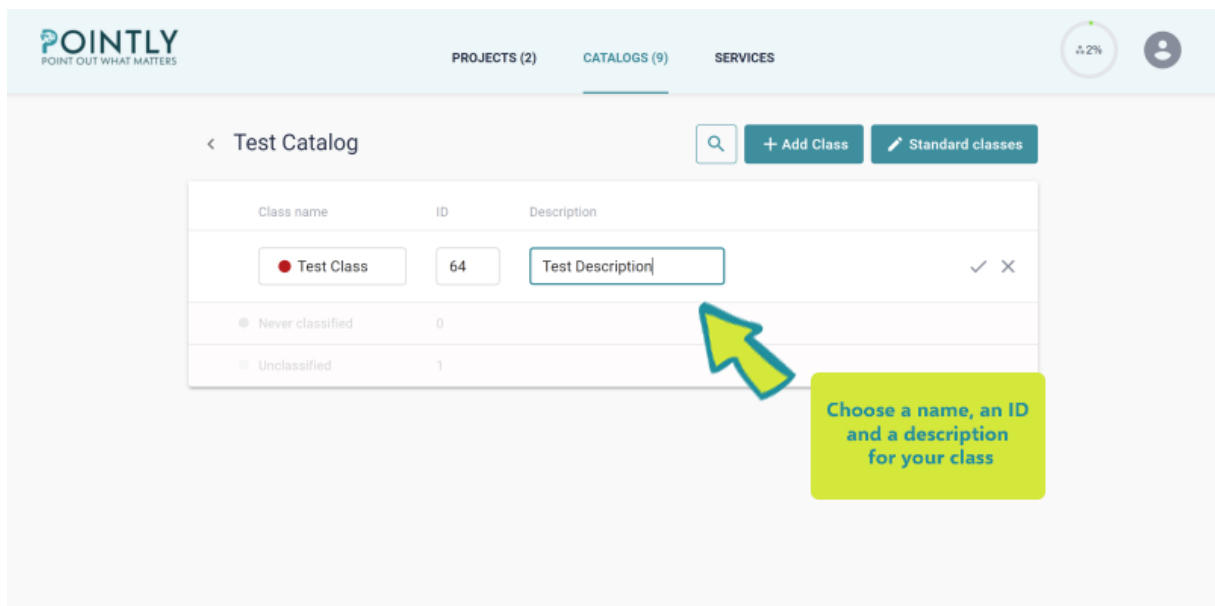
The screenshot displays the 'Class catalogs' management interface in the Pointly application. At the top, there is a navigation bar with the Pointly logo, 'PROJECTS (2)', 'CATALOGS (8)', and 'SERVICES'. Below this, a search icon and a green '+ New Catalog' button are visible. The main content is a table with the following data:

Name	Assigned to Projects
Catalog 8	0 projects
Catalog 6	Test Project
Catalog 7	Test Project 2
Catalog 5	0 projects
Catalog 4	0 projects
Catalog 3	0 projects
Catalog 2	0 projects
Catalog 1	0 projects

You can name your class catalog and add [ASPRS classes](#) of your choice.

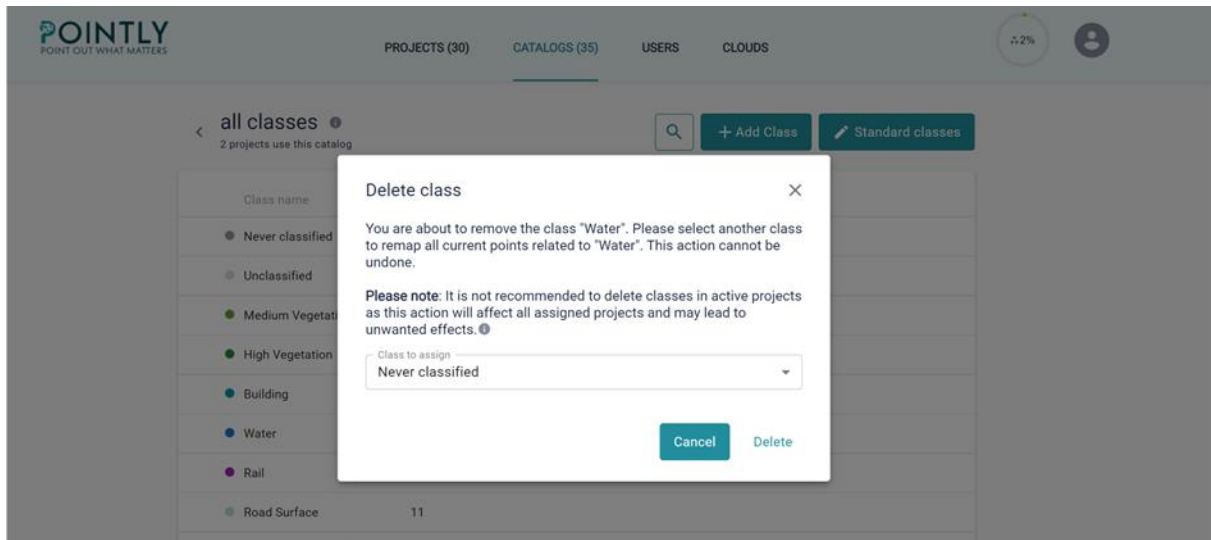


Afterwards, you can click on the catalog if you want to **add other classes** that matter for your Use Case. For example, you can create classes like vehicle or roof. You can choose a name, an ID and a description for your class.

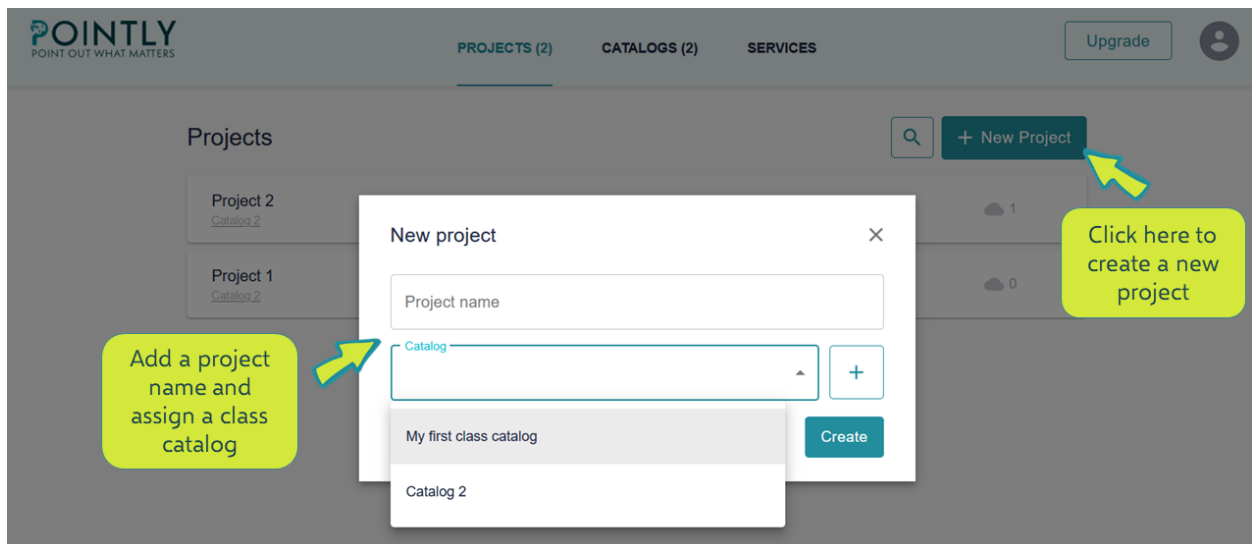


Even though some IDs are reserved for standard classes, you can edit these standard classes once they are added: change their names, colors, and descriptions.

In case the class was added by mistake or not needed anymore, you can simply delete it again. You will be suggested to select another class from the same catalog to remap current points related to this class. Keep in mind that this action cannot be undone, and we highly encourage you not to delete classes in active projects.



In order to **create a project**, go to “Projects” and click on the button “+ New Project”. Add a project name and choose the class catalog of your choice.



You can only assign one class catalog for each project, but you can assign the same class catalog to several different projects. The projects will contain all the point clouds you will upload, so a best practice is to know beforehand what kind of point clouds you will upload to which project in order to create a suitable class catalog.

3.1.1. Catalog remapping for exported clouds

In the “Catalogs”, you can apply a remapping of the class IDs. Remapping means changing the ID of a specific class or deleting all points with a specific ID. These changes apply only after you export the clouds, meaning that they will not be visible in the Pointly Viewer.

Remapping classes can be useful if you use a different internal catalog for processing the classified point clouds, or for merging classes together. Deleting classes is useful if you need

only part of the point cloud to continue working on it, e.g., if you work with vegetation, you can delete the Ground class.

Attention! The remapping will be applied to **all** projects which use the catalog.

To apply a remapping on a catalog, go to the catalog. Hover over the class which you want to remap and click the pencil icon.

Class name	ID	Export remapping	Description
Never classified	0	0	
Unclassified	1	1	
Ground	2	2	
Low Vegetation	3	3	
Medium Vegetation	4	4	
High Vegetation	5	5	

In the column “Export remapping” you can enter the new class ID or select “Delete”. The class ID can take any integer value between 0 and 255. If the new class ID is the same as an existing class, the two classes will be merged in the downloaded point cloud.

Class name	ID	Export remapping	Description
Never classified	0	0	
Unclassified	1	1	
Ground	2	2	
Low Vegetation	3	3	
Medium Vegetation	4	4	
High Vegetation	5	5	
Building	6	6	
Low Point (noise)	7	7	
Water	9	9	
Rail	10	10	
Road Surface	11	11	
Wire – Guard (Shield)	13	13	

After you are done with remapping a single class, click the ✓ to save the remapping.

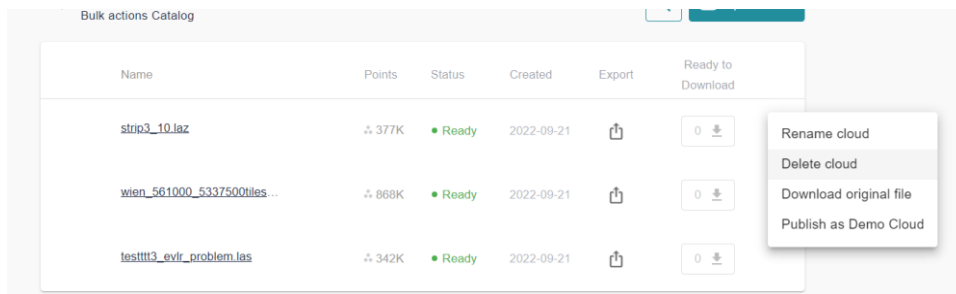
The changes will be applied for all point clouds using the catalog after export and download.

For more information on exporting and downloading point clouds in Pointly, refer to [Downloading point clouds](#).

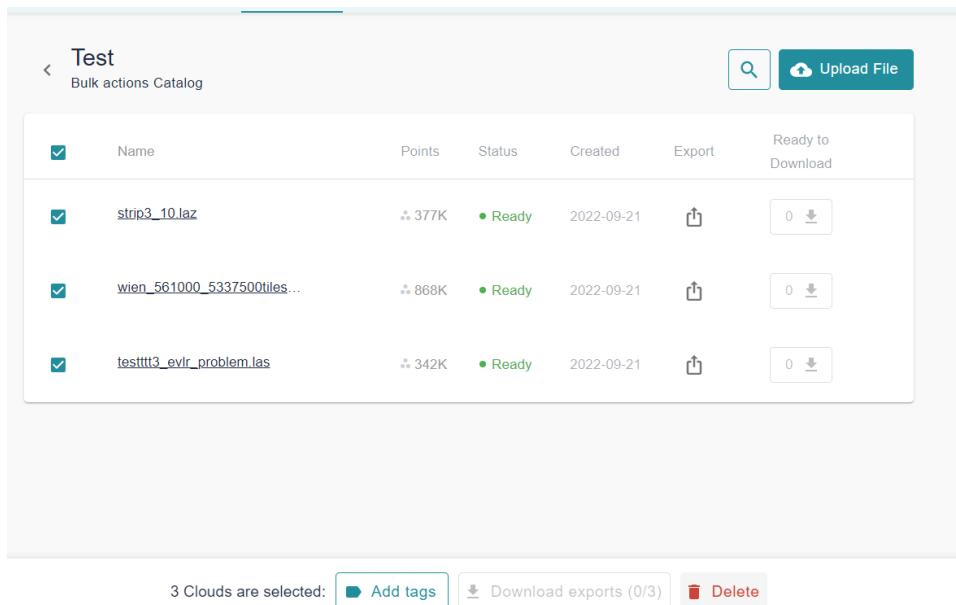
3.2. Deleting your clouds

You can always delete your clouds if you want to free up storage or if you don't need them on the platform anymore. You can do it either for a single file or for multiple.

To delete a single cloud just choose the wanted action from the list and confirm your choice.



Bulk deletion gives you a chance to remove multiple clouds simultaneously. To proceed, just select the wanted clouds and press **Delete** button at the very bottom of the page.



Keep in mind there is no way to retrieve deleted clouds. That's why we encourage you to double-check your choice and be careful.

4. The upload process

When you already have your point clouds in .las/.laz format, it is time to **upload them**. Click on the name of the project you want to have your point clouds in and then click on the button "Upload File". A window should pop up – that is the Upload Dialog.

Upload Dialog

In the upload dialog you can see your storage usage indicated by the bar on the top left. Keep in mind that the maximum point count is 150 MPoints per file with a Professional Account.

The Upload Process has 3 steps:

1) Select point clouds for upload.

There are three types of upload available: upload from local source, upload by link and upload from AWS S3 bucket. More on that in the section [The upload process](#).

2) Select the pre-processing for your point clouds.

The pre-processing options describe how Pointly recognizes related point segments which will help you to classify the files. The finer the segment scale, the more segments will be created in the pre-processing step. When in doubt, choose the default option, which is the finest.

Upload files
×

✓ Select files

2 Pre-processing

3 Automatic classification

Default

Default

The default pre-processing creates a fine segmentation of the point cloud. It is the recommended setting for most cases.

Coarse

This option can be used if the default option creates too many segments.

No Segmentation

The point cloud will be processed a lot faster. However, the segment selector tool will not work for manual classifications/corrections.

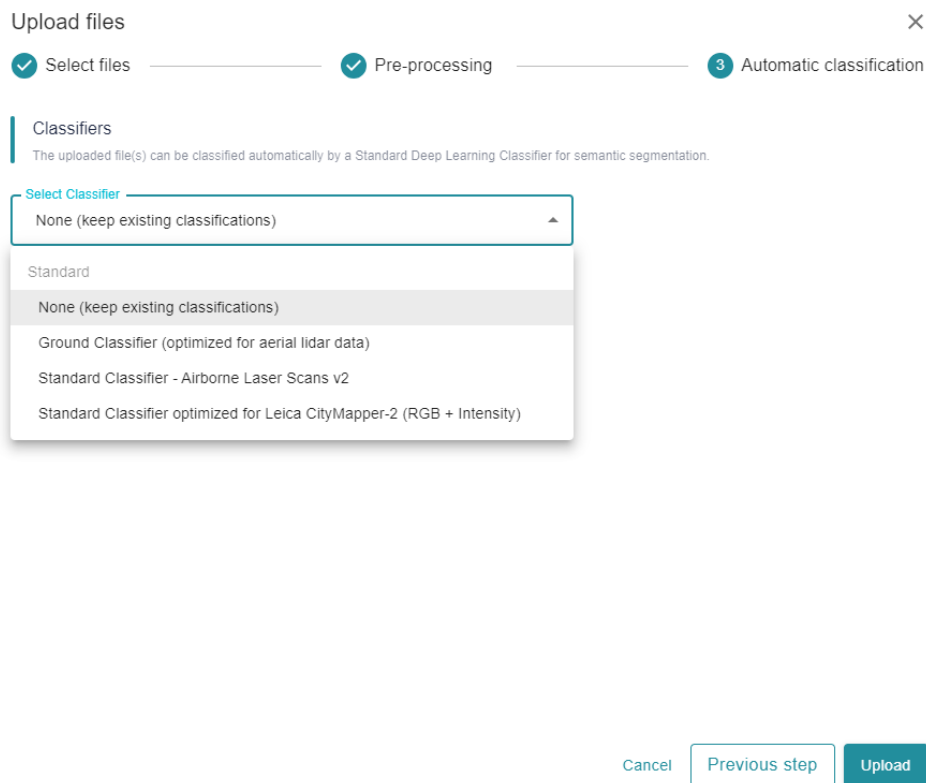
Add a pre-processing tag to the uploaded file(s)

Cancel
Previous step
Next Step

3) Choose a classification model

“None” is the default choice. Standard classifiers will classify the point clouds according

to the applied trained model. When a Classifier is selected, any existing classification in the point clouds will be overwritten.

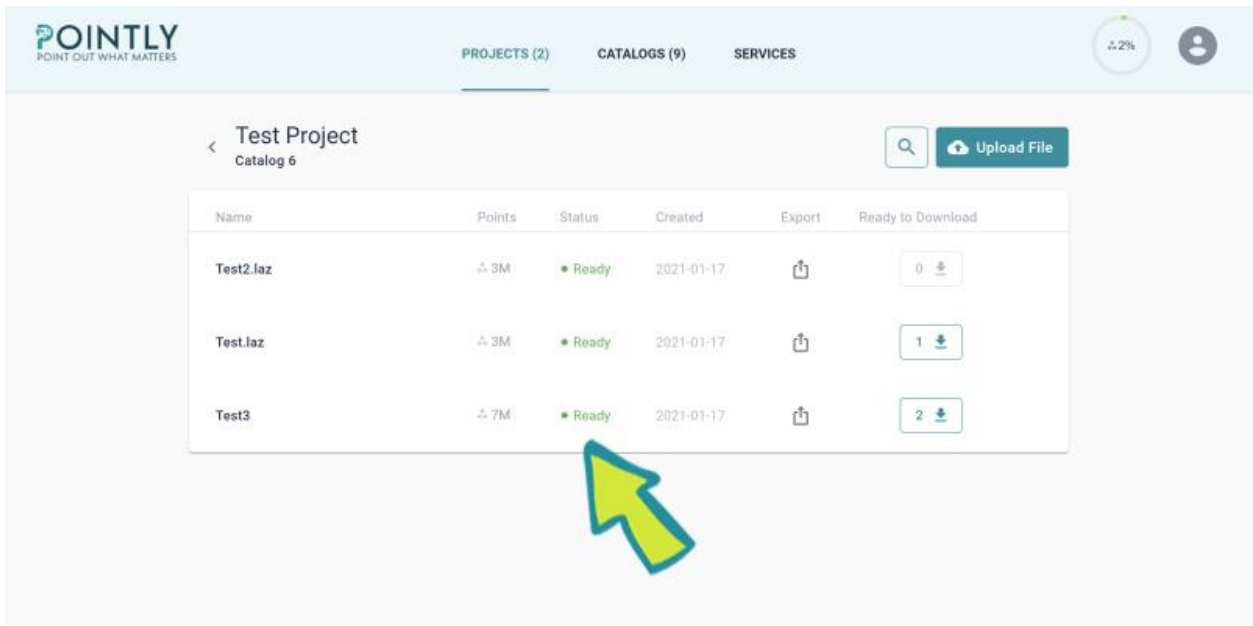


You can switch between the 3 pages in the Upload Dialog using the Next Step and Previous Step buttons. Kindly note that you should select at least one cloud to jump to the second step. Press Upload to proceed and start uploading files to the system.

Good to know: your point clouds will be available in their full resolution without compression.

After the upload of your file, it needs to be processed by Pointly before you can view and edit your point cloud. The processing itself is directly dependent on the size of the point cloud. This process normally takes between 5 and 30 minutes but should not exceed the 2-hour mark.

You can **check the upload status** in the project view. When the status shows “**Ready**”, your point cloud is ready to be classified in Pointly! Just click on it and you will be redirected to the live viewer.

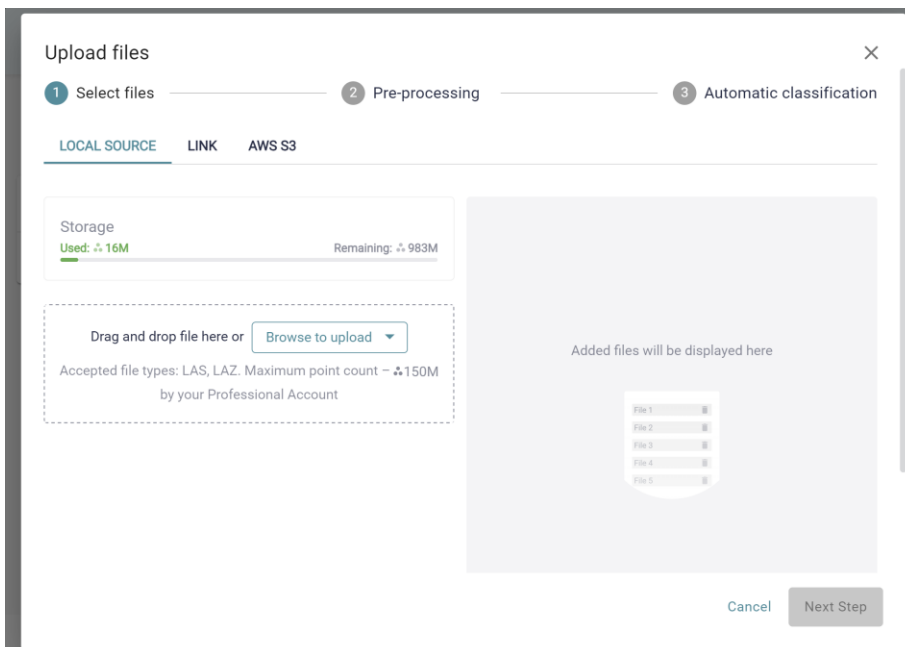


If the point cloud status is **queued**, our servers are busy and will be scaled up after a while. Thus, you might just wait until there is free capacity for your point cloud.

4.1. Local source

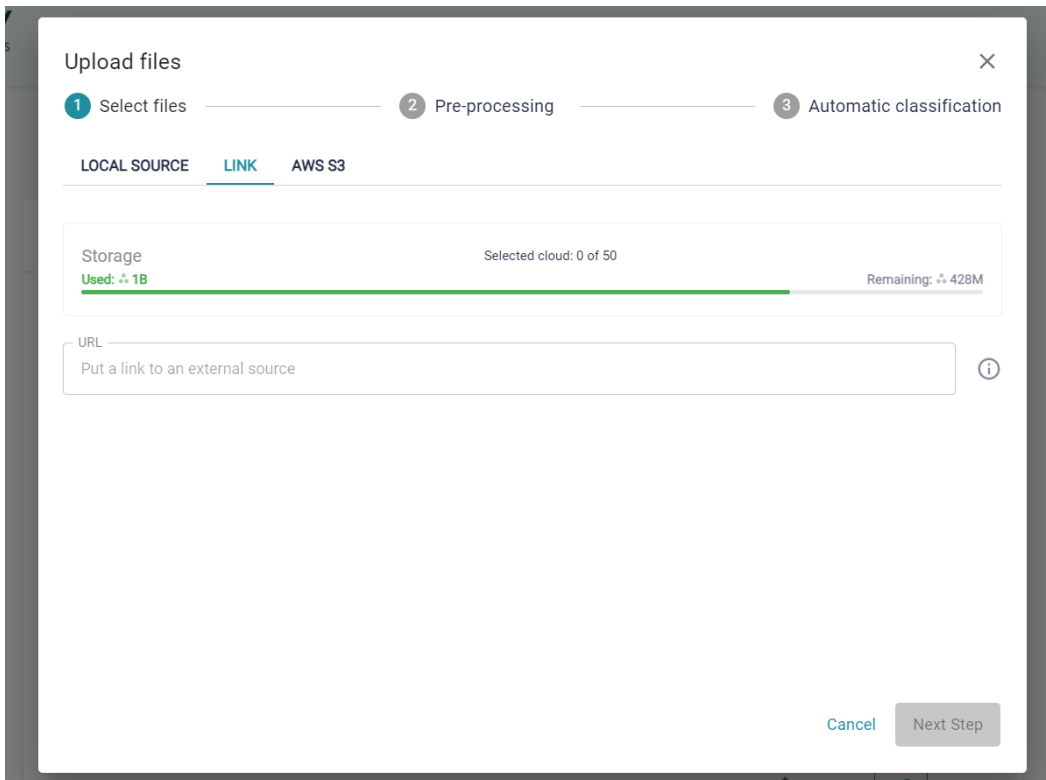
You can upload point clouds via drag and drop or browse from your computer.

The added files will be listed on the right side of the upload window.

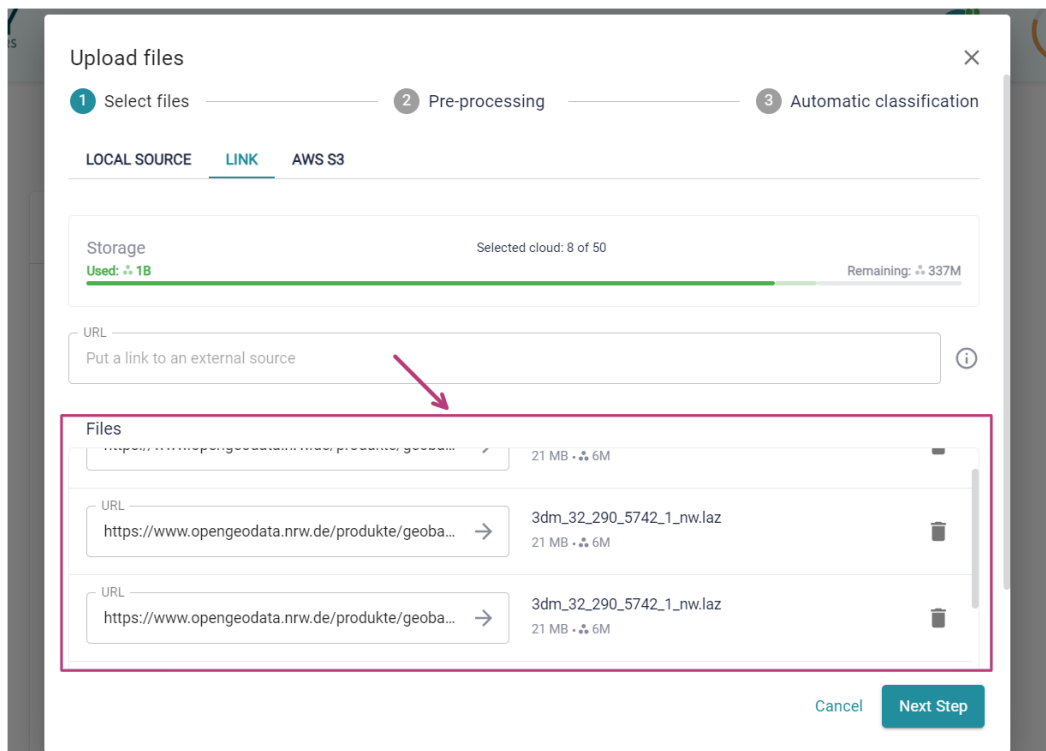


4.2. Upload by link

You can upload point clouds by their public URLs (for example, AWS S3 bucket SAS Url or Azure Blob Storage SaS Url). The URL should be entered in the field on the screenshot below. You can upload multiple files by pasting their links separated by “;” or whitespaces.



After adding the files, they will be displayed in a list below.



There you can delete files from the list as well as edit the entered links. After you are done with the cloud selection, click "Next Step" to proceed.

4.3. AWS S3

On the AWS S3 tab in the upload dialog you can upload clouds from your S3 bucket.

Upload files ×

1 Select files ————— 2 Pre-processing ————— 3 Automatic classification

LOCAL SOURCE LINK **AWS S3**

Storage
Used: 16M Remaining: 983M

AWS secret ID AWS secret key

Select Region S3 bucket address

Path (optional)

? [How to create AWS S3 bucket access key?](#)

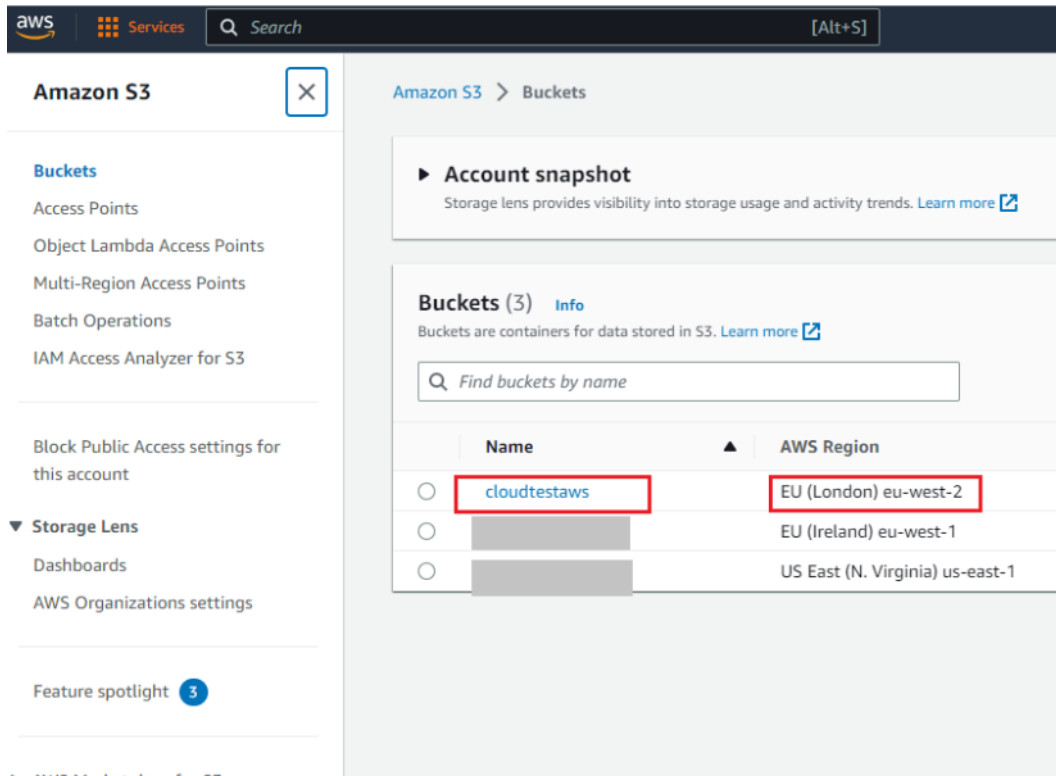
Connect to AWS

Cancel Next Step

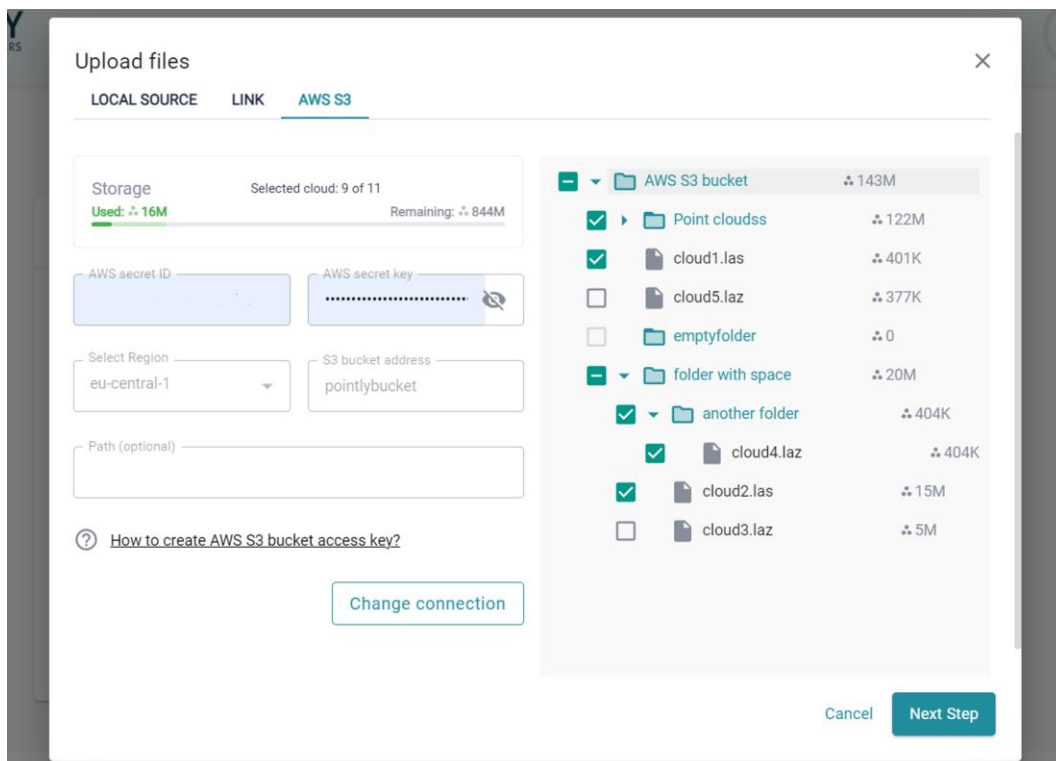
Here will be files and folders

To do that, you first need to connect Pointly to your AWS. The fields to fill out are:

- AWS secret ID (required, also called access key ID)
- AWS secret key (required, also called secret access ID)
- Region (required, 'AWS region' column on the image below)
- S3 bucket address (required, 'Name' column on the image below)
- Path (optional, use it if you would like to open a specific folder in your bucket instead of starting from the root folder)



Once you have filled out all the necessary fields and clicked “Connect to AWS”, the contents of your bucket will be displayed. Here you can select clouds which are to be uploaded. In case you want to connect to another bucket, click the “Change connection” button.



Once you are done with file selection, click “Next Step” to proceed.

Find a detailed tutorial in our How-To Article on our website:

<https://pointly.ai/create-access-aws-s3-buckets-from-cloud-platforms/>

5. Standard Classifiers

Standard classifiers are trained models that can be used to classify point clouds automatically on upload. Each model is trained for a specific data type and set of objects (dedicated class catalog) which will be merged into the current project catalog if used. Standard Classifiers can only be used during the upload process and not afterwards.

5.1. In addition to the standard classifiers, Pointly offers the option to train a custom classifier. This is a model which is trained according to your requirements and available solely for you and your organization. If you are interested in this option, please contact us at sales@pointly.ai. Applying Standard Classifiers

To apply any of available standard classifiers, open a project and press the Upload File button, then select a file and segment scale and proceed to the second step of the upload process. There you will see a dropdown menu where you can check the list of standard classifiers and choose one of them. Each standard classifier has its own catalog, which is displayed below the dropdown. If some of the catalog IDs are already present in the current project, they will be highlighted in this dialog but not overwritten by the classifier. That is why we would recommend creating a separate project with a clean catalog to use a Standard Classifier and to use different projects when using several Standard Classifiers.

You can also check the option to add a tag with the model's name to each uploaded file.

After the clouds are selected and the model is chosen, press Upload and let the magic happen.

Once the clouds are processed, you can open them and see the classification results in the Viewer. In case some objects are classified incorrectly, you can correct that manually.

Upload files ✕

Select files and segmentation scale
 —————
2 Automatic classification

Standard classifiers

The uploaded file(s) can be classified automatically by a Standard Deep Learning Classifier for semantic segmentation.

Select Classifier

None (keep existing classifications) ▲

None (keep existing classifications)

Ground Classifier (optimized for aerial lidar data)

Standard Classifier - Airborne Laser Scans

Cancel
Previous step
Upload

Dropdown to select a Standard Classifier

Upload files ✕

Select files and segmentation scale
 —————
2 Automatic classification

Standard classifiers

The uploaded file(s) can be classified automatically by a Standard Deep Learning Classifier for semantic segmentation.

Select Classifier

Standard Classifier - Airborne Laser Scans ▼

Detect various objects on airborne laser scans. The model was optimized for point clouds with average densities of 10 to 50 ppm³.

Applied classes

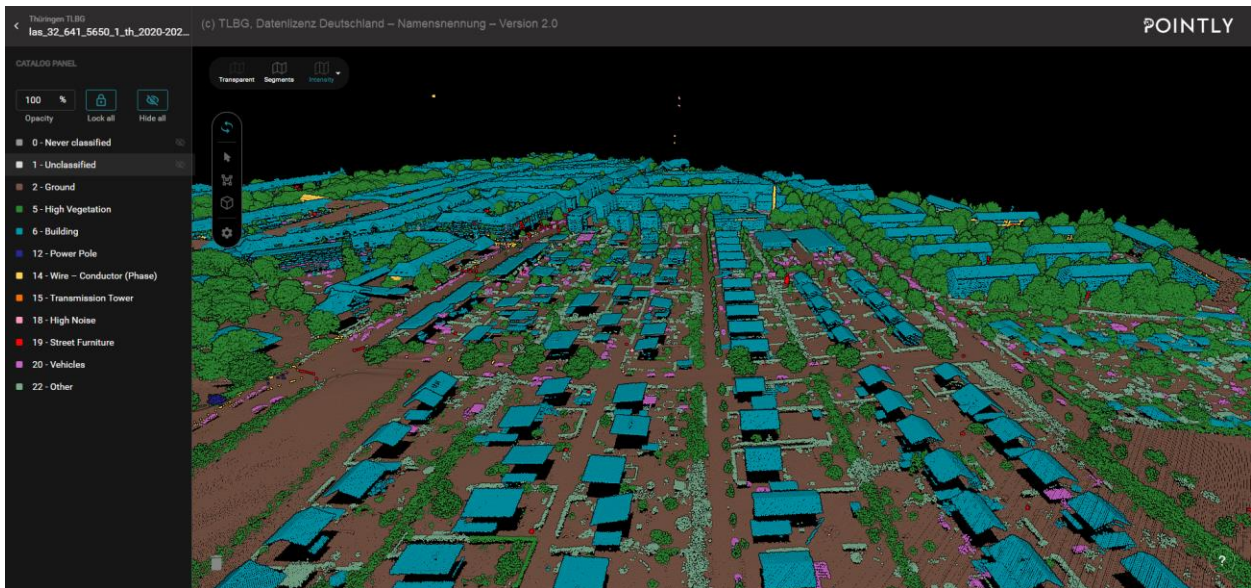
0 - Never classified	6 - Building	18 - High Noise
1 - Unclassified	12 - Power Pole	19 - Street Furniture
2 - Ground	14 - Wire - Conductor (Phase)	20 - Vehicles
5 - High Vegetation	15 - Transmission Tower	22 - Other

Add model tag to the uploaded file(s)

! When applying a Classifier, the class catalog might be updated with additional classes according to the model. Any existing classes in the catalog will not be changed.

Cancel
Previous step
Upload

Standard Classifier selected and preview of applied class catalog

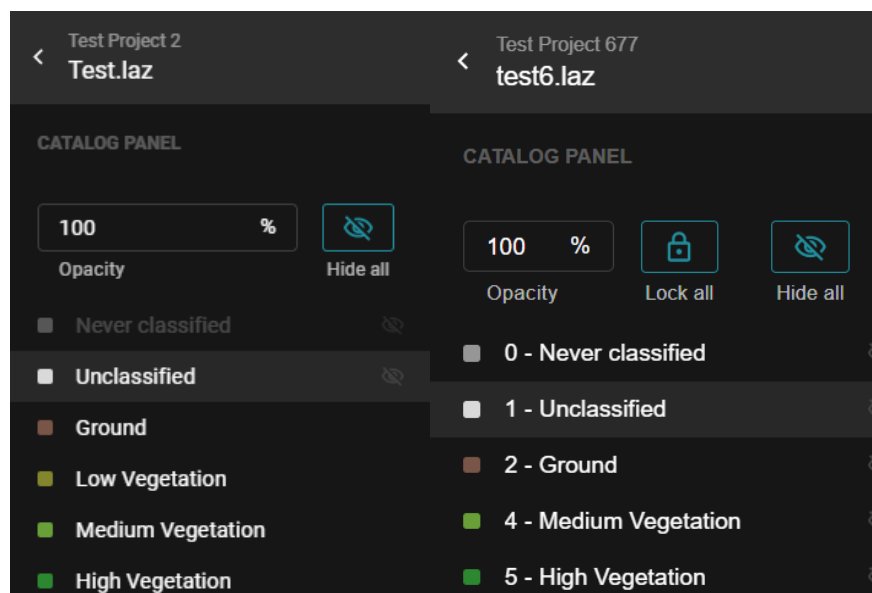


Results of the Standard Classifier for Airborne Laser Scans

6. Exploring the live viewer

6.1. Catalog panel

On the left side of the live viewer, you can **see the catalog panel with the class catalog** of your project. The opacity of a class can be adjusted after the class has been selected. Classes can be hidden or unhidden by **clicking on the eye symbol**.



6.2. Different views

The different types of views help you to classify your point clouds more effectively.

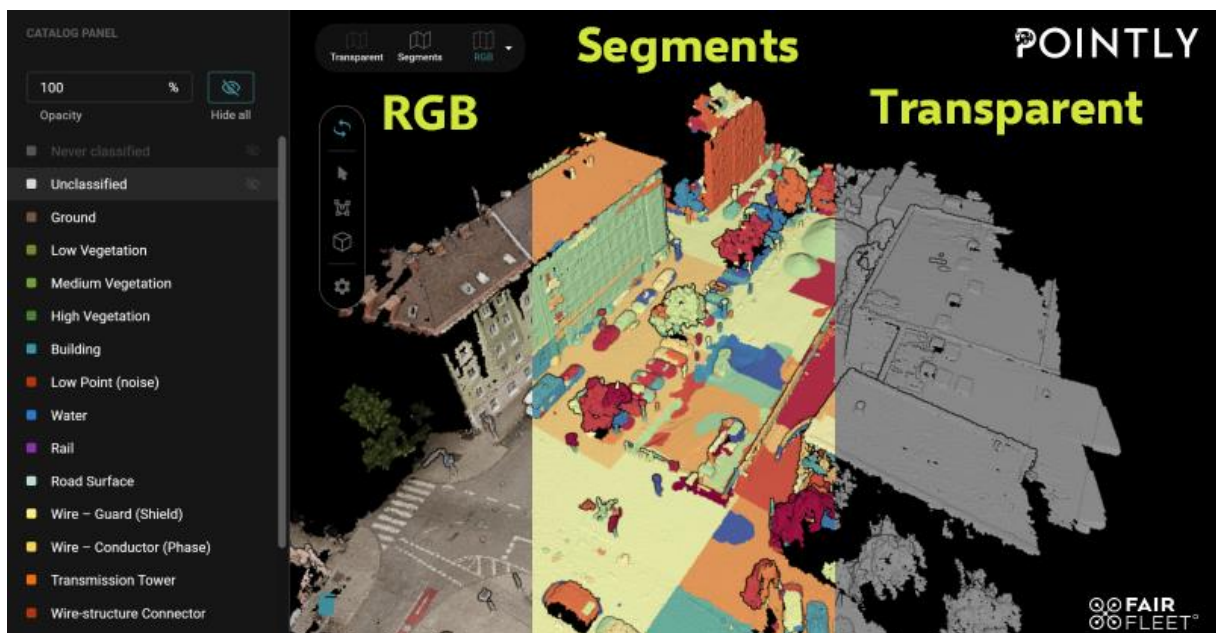


The standard views are:

RGB – This view allows you to display the RGB information of the point cloud (if it is present).

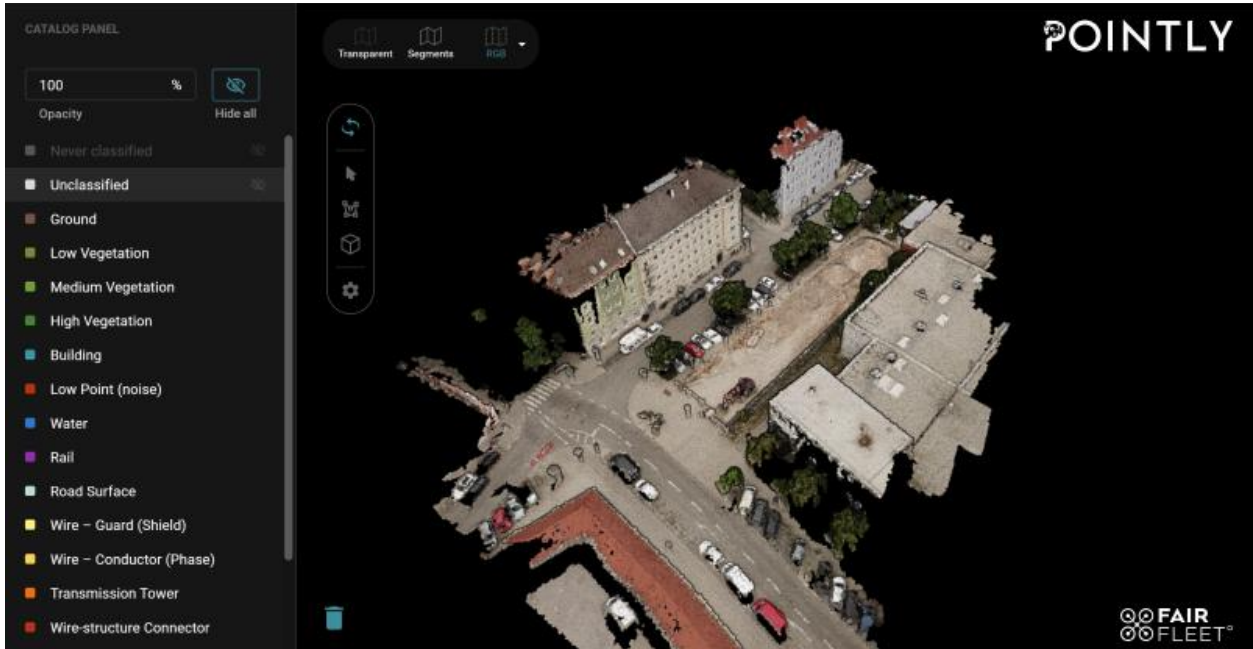
Segments – This view displays the pre-processed segments generated by Pointly.

Transparent – This view can be used to hide or highlight selected classes and gives you the possibility to focus on the objects which matter for your use case.



6.3. Hiding Classes

Working with the eye symbol lets you see different results of your labeling work. The **standard view** which you will see in Pointly is the RGB view with 2 hidden classes – “Never classified” and “Unclassified”. You can see the standard view in the picture down below.



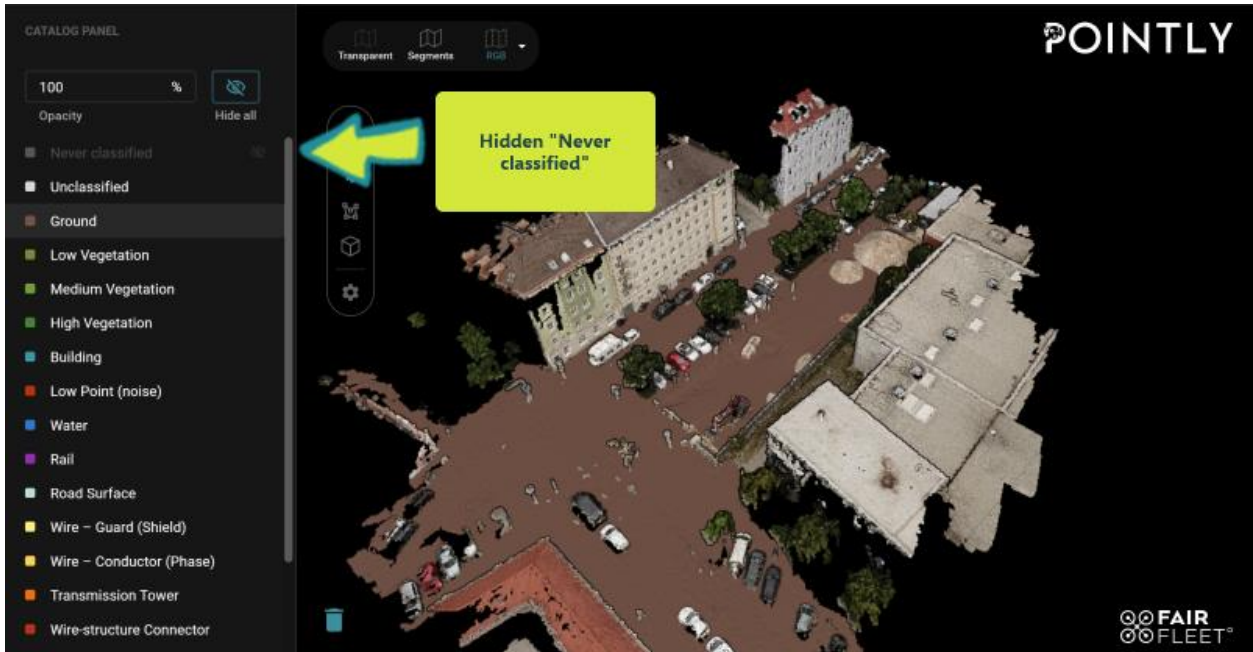
If you **click on the eye symbol “Hide all” to unhide all classes**, you will see this view:



After labeling some of the objects, you can play with the eye symbol to find your way to work with it. You can also **hide or unhide only one specific class or several**. If a class is hidden, the

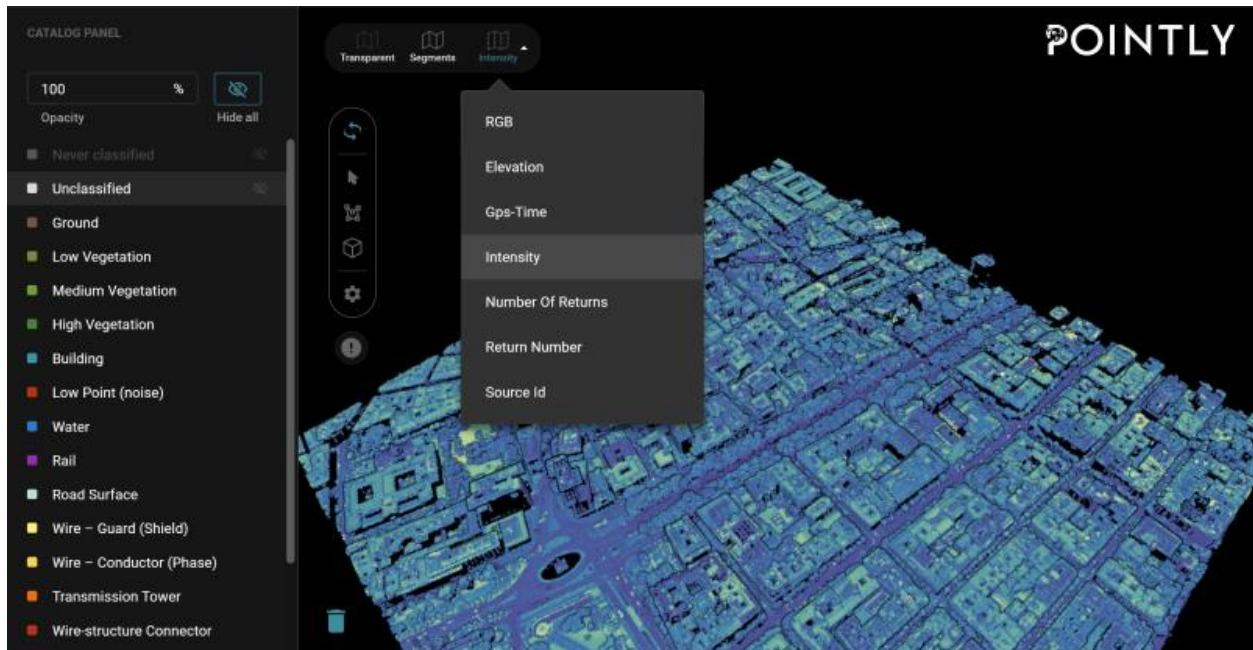
eye symbol is crossed out and appears on the right side next to the class. If a class is unhidden, you will not see the eye symbol next to it. In case the viewer is in transparent view, and a class is hidden, the class will be automatically locked. For more information on locking classes, refer to [section Locking](#).

It can be useful to hide the classes "Unclassified" / "Never Classified" and using RGB / Intensity or Segments view to classify. These views give good visibility to what you are about to classify:



6.4. Dimensions available on point clouds

Apart from the standard views, you can **make use of different dimensions**. You can find them by clicking on the “RGB” view. The number of dimensions displayed there depends on your point cloud type. Some of the possible views are for example “Elevation”, “Number of returns” or “Intensity”. They all can help you to see different parameters in your point cloud. Following is an example of a point cloud where you can see 7 dimensions:



Work derived from LiDAR-PNOA 2016 CC-BY 4.0 scene.es

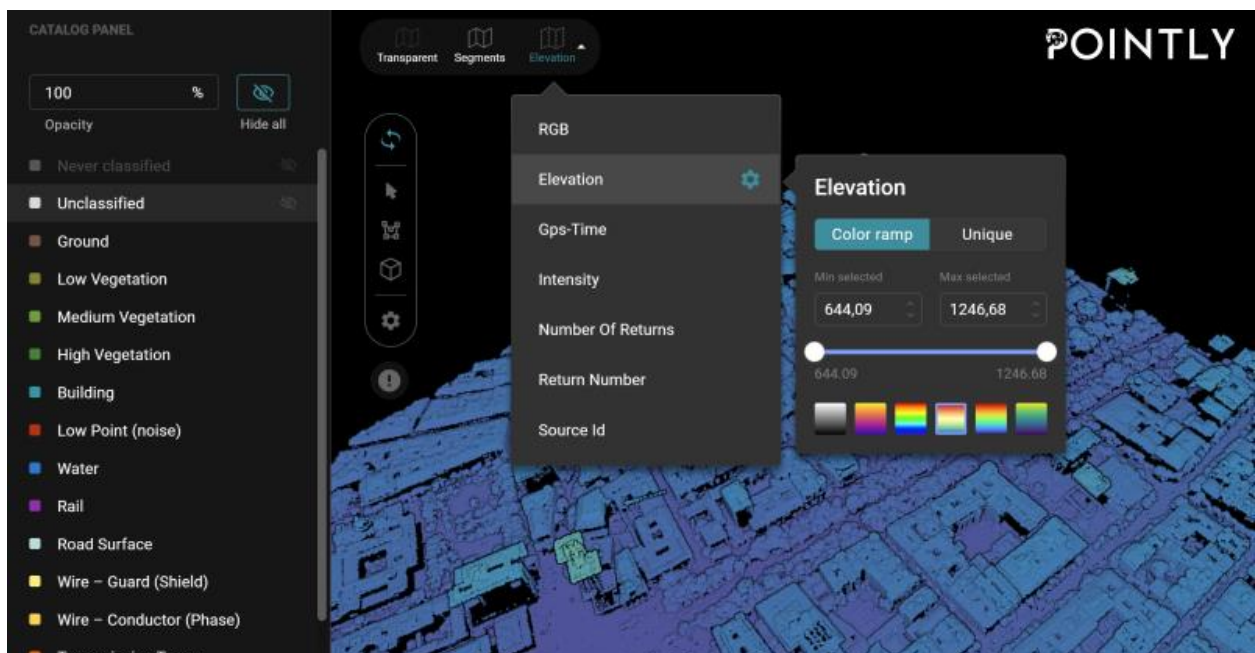
- 1) **RGB** – As mentioned above, this view allows you to display the RGB information in the point cloud if it is present. If it is not present, it will not be displayed.
- 2) **Elevation** – This is the simplest form of coloring and applies a color spread to the range of LIDAR point elevations. It can help for orientation in case there is no intensity of RGB values available.
- 3) **GPS time** - For every laser shot fired there are discrete LiDAR returns. Each of these is then given the exact same GPS time stamp that corresponds to the moment in time the laser pulse was fired. So, GPS Time is the double floating point time tag value at which the point was acquired.
- 4) **Intensity** – This is the integer representation of the pulse return magnitude. This value is optional and system specific.

- 5) **Number of Returns** – This is the total number of returns for a given pulse. For example, a laser data point may be return two (Return Number) within a total number of five returns.
- 6) **Return Number** – This is the pulse return number for a given output pulse. A given output laser pulse can have many returns, and they must be marked in sequence of return.
- 7) **Source Id** - This value indicates the file from which this point originated.

Source: https://www.asprs.org/a/society/committees/standards/asprs_las_format_v12.pdf

When you place your cursor on the right side of the bar with a chosen dimension, you will see the gear symbol where you can **change settings for this dimension**.

An important hint: clicking on the gear symbol does not automatically change the dimension view. Make sure to click on the dimension name first and afterwards change the settings in order to see the results.



Work derived from LiDAR-PNOA 2016 CC-BY 4.0 scne.es

You can **choose between “color ramp” and “unique”**. The “color ramp” option displays a seamless transition of colors corresponding to changing values, whereas the “unique” option

assigns distinct colors to specific value ranges. At the bottom of the box, the color palette can be changed.



Here you can see an example of the dimension with the unique gradient type:



Work derived from LiDAR-PNOA 2016 CC-BY 4.0 scne.es

6.5. Selection tools

As some shapes like trees or wires might be tricky to classify, we adjusted our selection tools to provide you smooth and precise object classification.



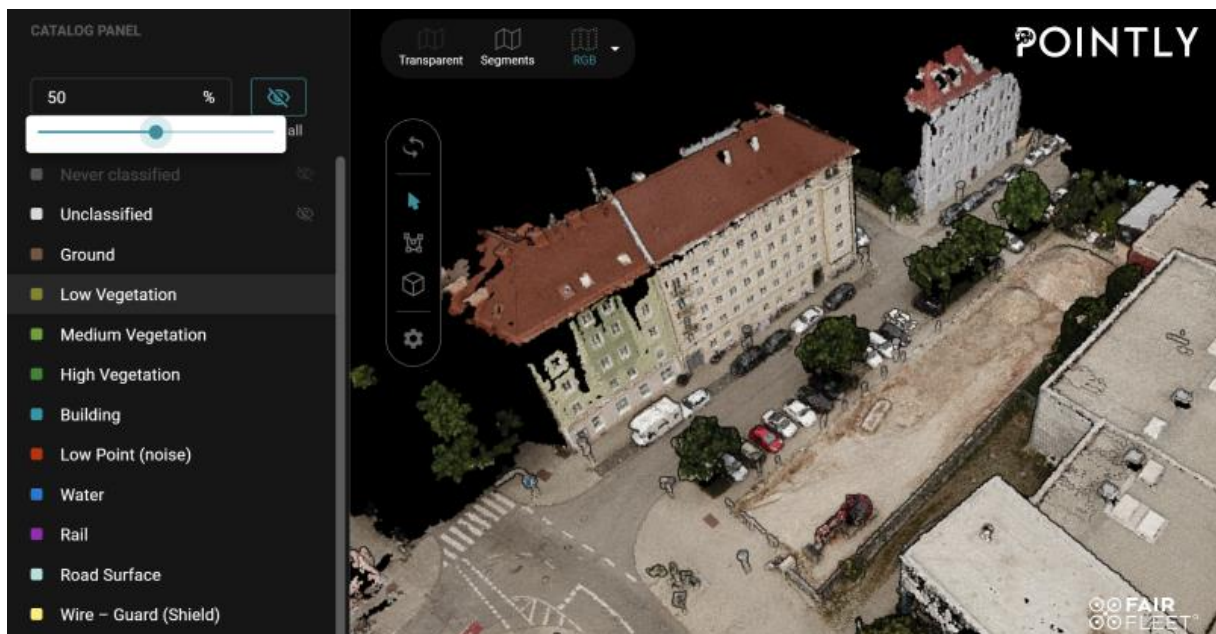
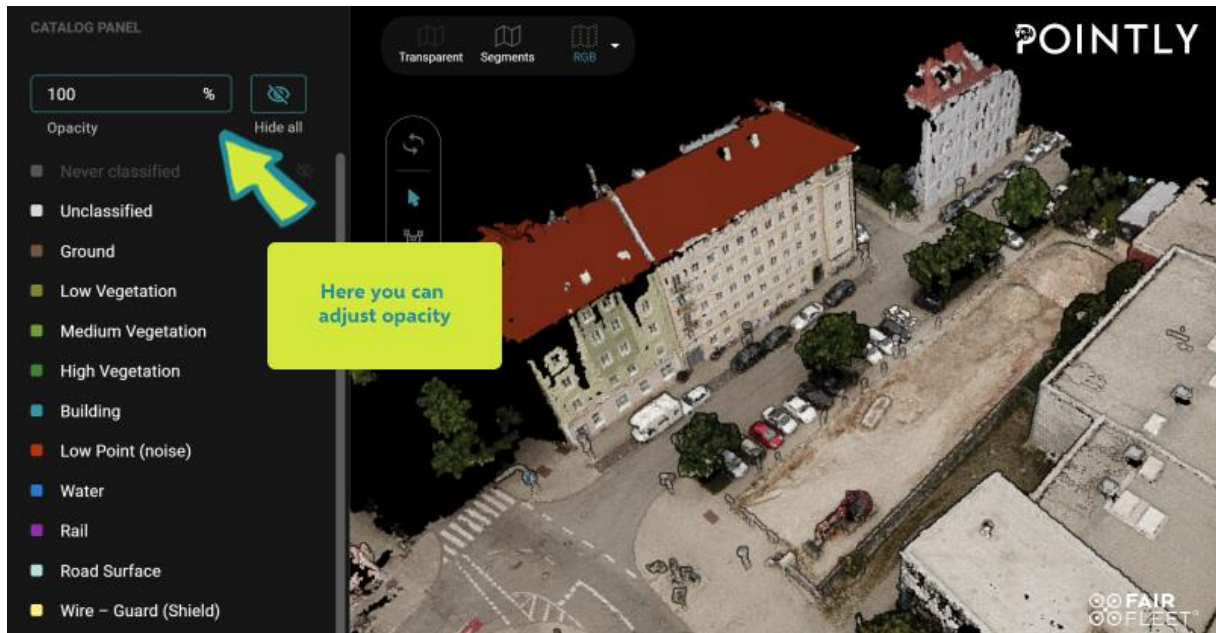
Right now, you can use following tools:

- Free View
- Segments Selector
- Polygon Lasso Tool
- 3D Bounding Box
- Viewer Settings

We start with the explanation of Viewer Settings as it is important to adjust the settings before starting your classification work. Other tools will be explained in the next chapter with a detailed description of how to work with them.

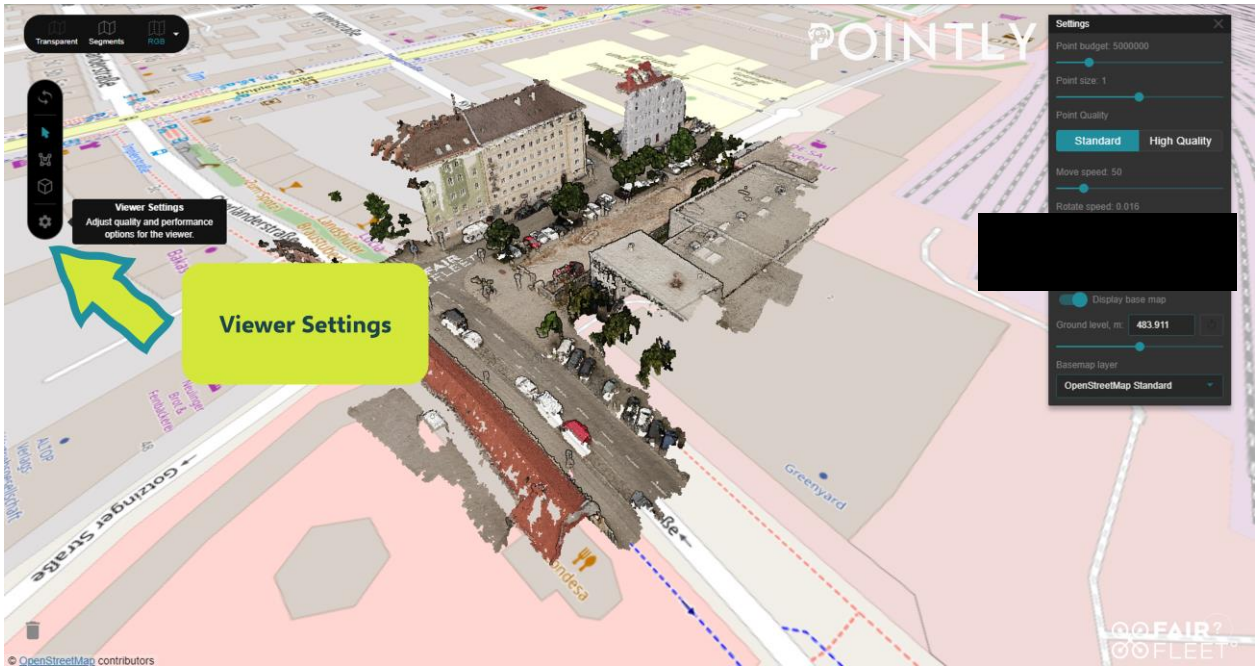
6.6. Opacity adjustment

Next to the eye symbol is the opacity adjuster. Just **drag the bar to adjust the opacity** of classified objects (below you can see an example with classified rooftops).

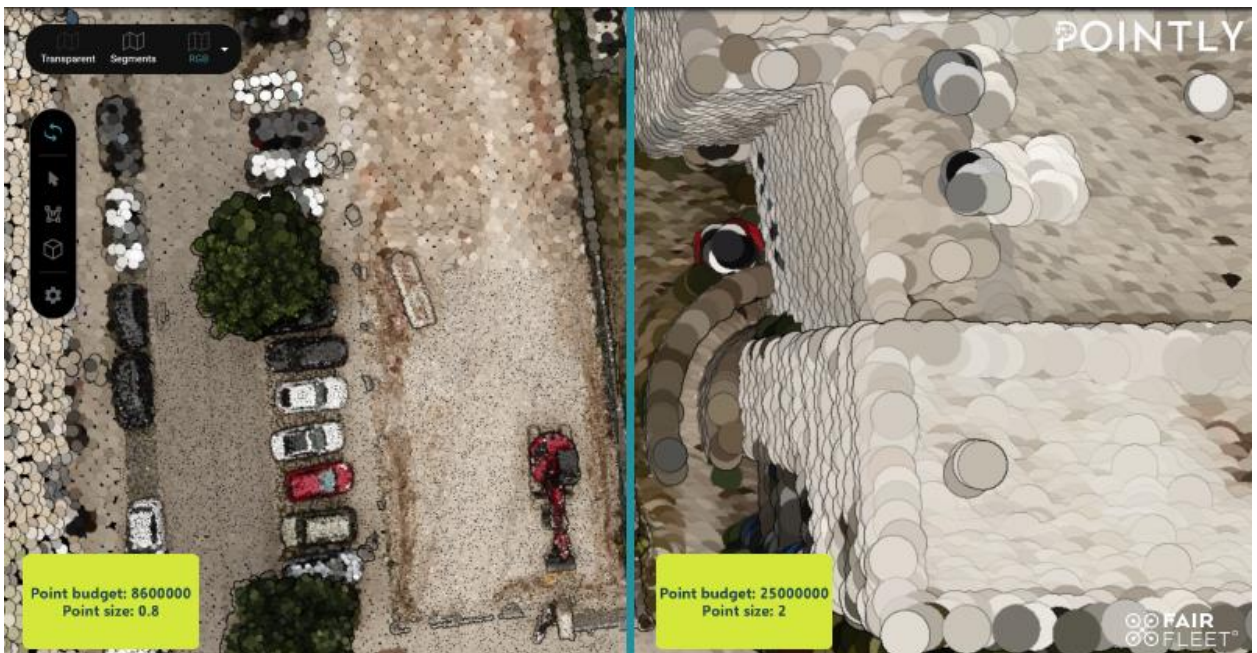


7. Viewer Settings in Pointly

The Viewer Settings let you **adjust the point budget and point size** and choose the point quality. The point budget is a limit on the number of points which are displayed at once. Simply drag the bar to find the optimal view of your point cloud.



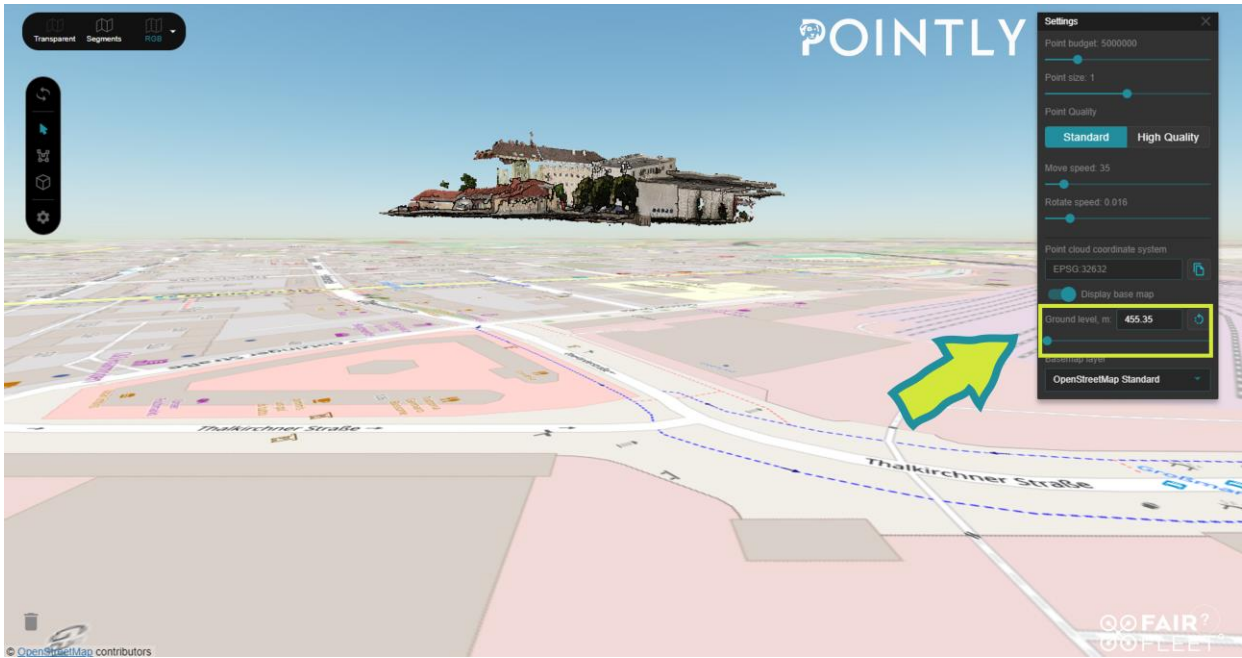
Below is a small comparison of how adjusting the settings can change the look of your point cloud.



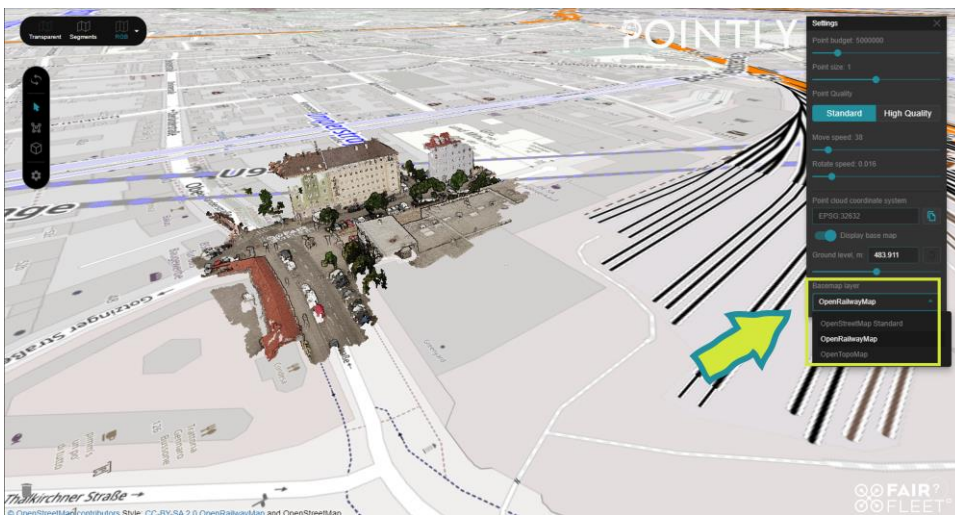
7.1. Map Settings

Some point clouds contain geographical information. These point clouds will be displayed over a map in the Viewer. The map can be turned on or off from the Viewer settings menu and is using [OpenStreetMap](#), Open Railway Map and Satellite imagery.

The map layer is automatically placed at the level of the lowest point in the point cloud. If the level is not looking well (e.g. floating above the map as in the image below), it can be adjusted from the Ground level slider or number field in the Viewer settings menu.



The map style can be selected from the drop-down menu at the bottom of the Viewer settings.



8. Classification

8.1. Locking and Unlocking Classes

Applies to:
To all accounts

8.1.1. Locking and Unlocking Single Classes

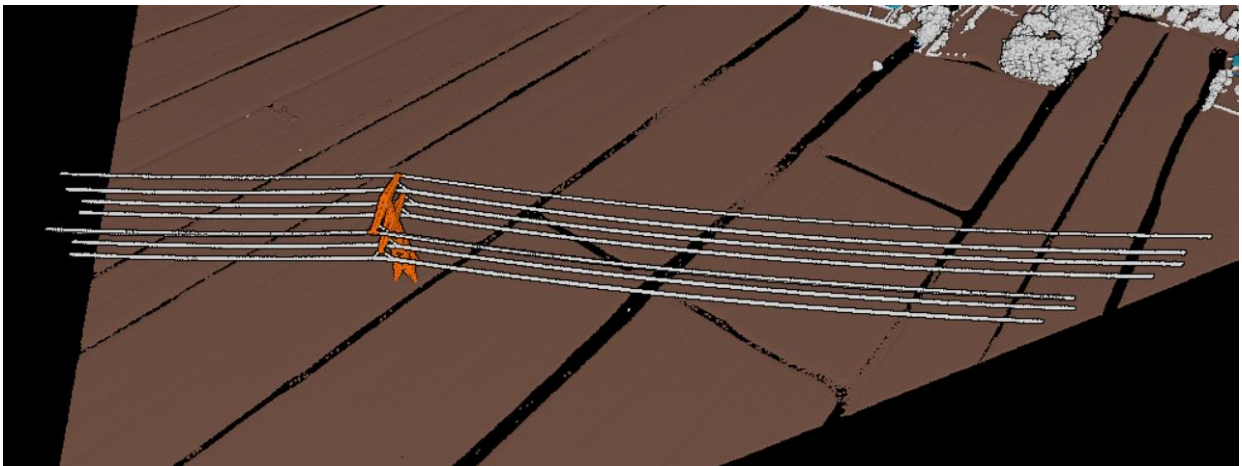
The Locking classes feature can make the classification process more efficient. If point clouds were uploaded pre-classified, the existing classification can be locked to not overwrite them.

During the classification process, it can be very helpful to lock completed classifications while doing new classification commands.

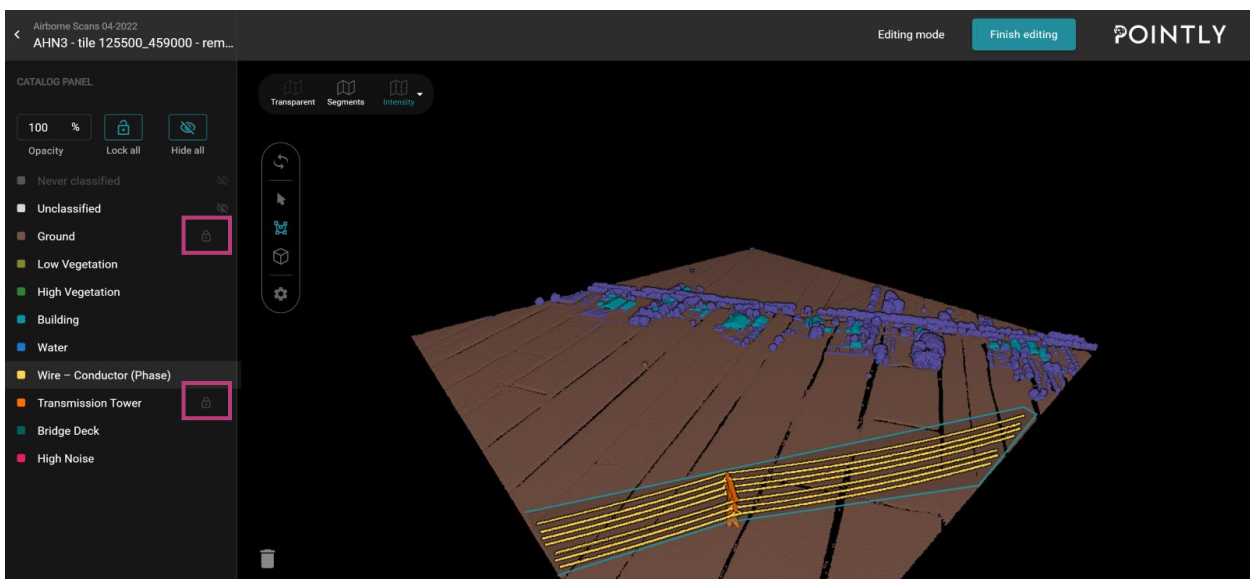
For example, once the Ground was classified in a point cloud, it can be locked to quickly classify vegetation with the polygon tool.

The option to lock classes is available for every user and can be used in combination with the 3 classification tools (Segment Selector, Polygon Lasse, 3D Bounding Box). Just open any cloud in the Viewer and start labeling it. Then click the **Lock symbol** near the classes that you want to lock, then choose another class and start labeling the objects without overwriting already made classifications.

In the example below Ground and Transmission Tower were already classified and class locking can be used to easily classify the Power Wires.



On the second screenshot you can see the classification process. The classes Ground and Transmission Tower are locked, and Wires can be classified with the polygon tool



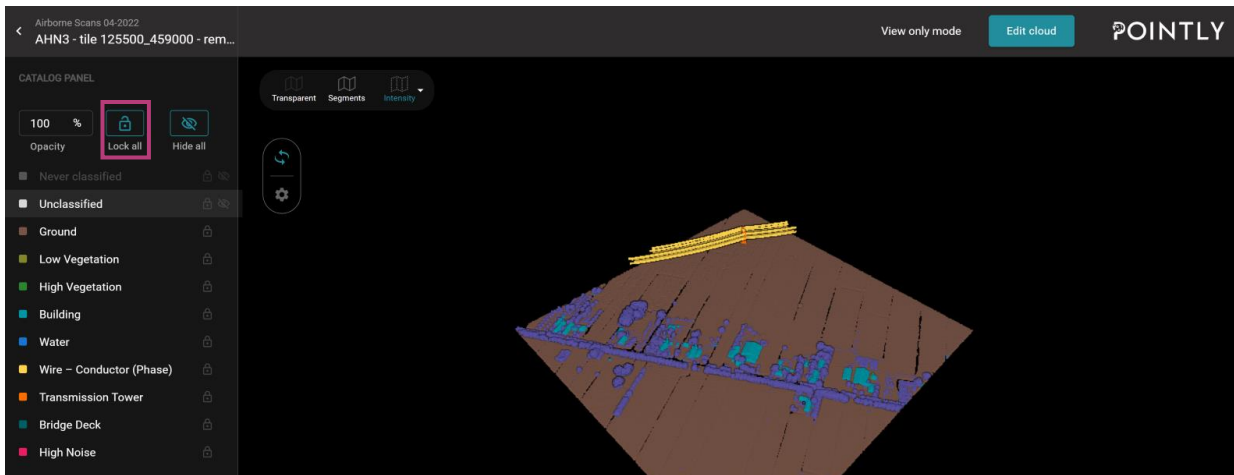
As a result, Wires are successfully labeled, while the Transmission Tower and Ground remain untouched.

To unlock the class, click the same **Lock symbol**.

Good to know: You can still classify with a locked class.

8.1.2. Locking All Classes

Additionally, all classes can be locked at once by pressing the **Lock all** button which is placed between **Opacity** and **Hide all**.

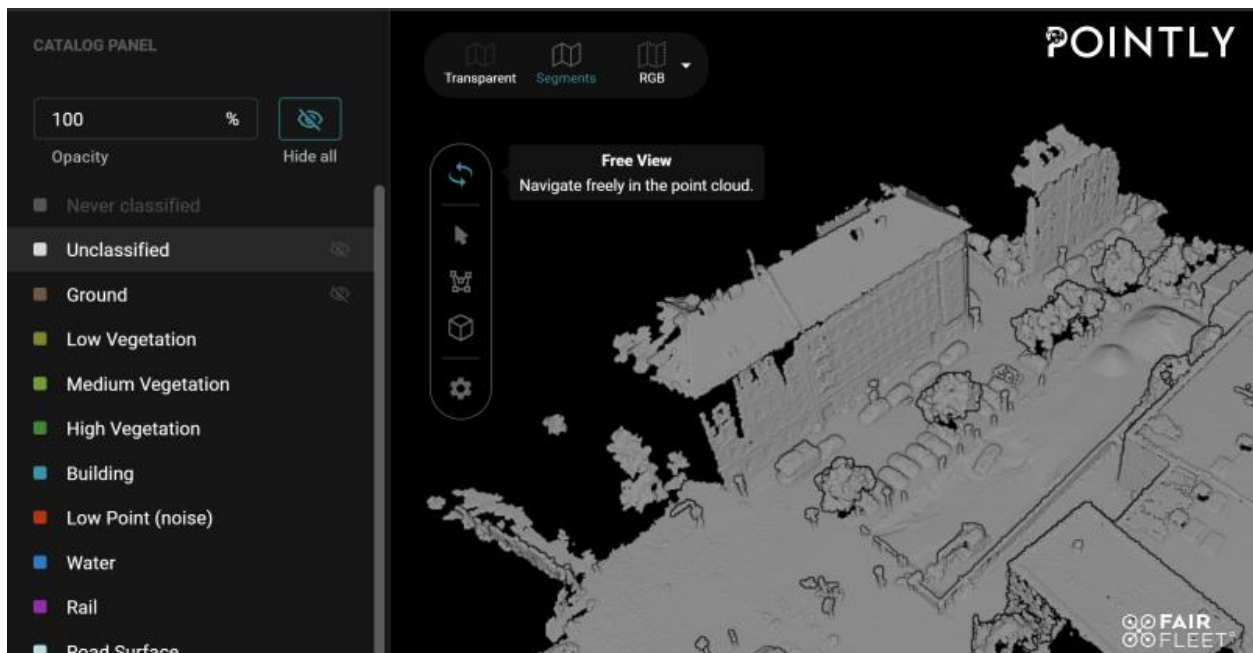


This feature can be used in order to lock all classes and only unlock one. This can be useful to do specific corrections or to reclassify a complete class.

You can also lock all classes except Unclassified to fix all previous classifications.

Keep in mind that classes become unlocked after the page is reloaded, so be careful when you start to classify the cloud again.

8.2. Adjusting the view

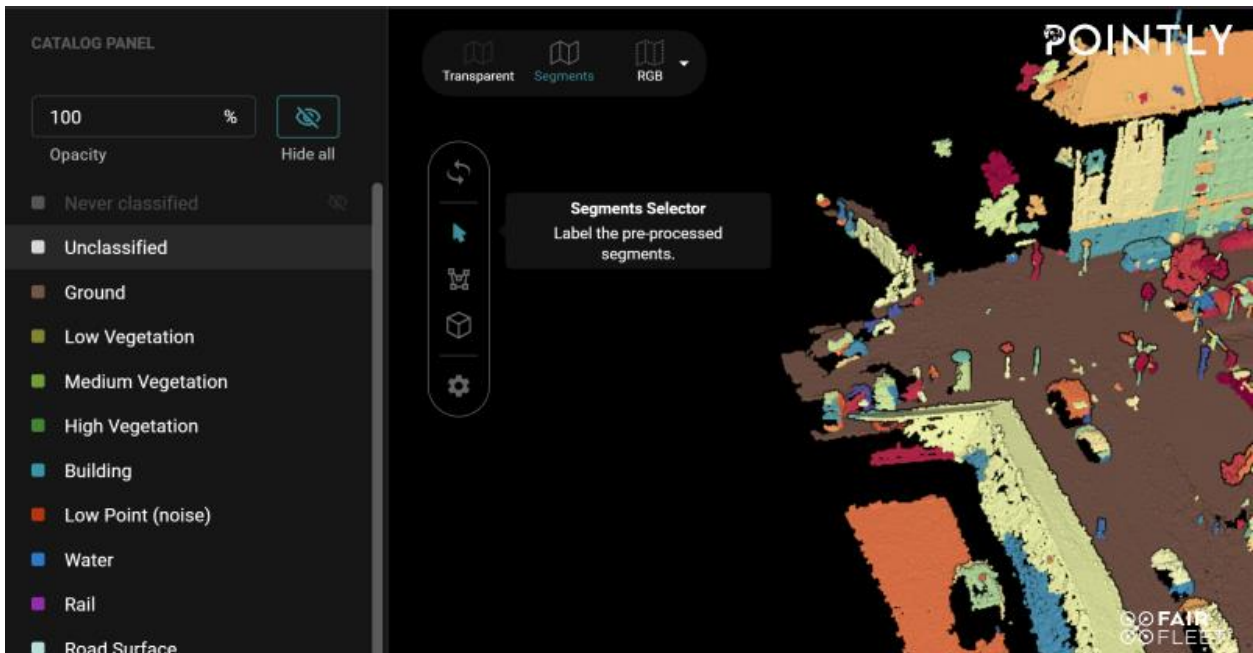


The first tool, Free View, lets you navigate freely in the point cloud. You can **rotate your point cloud** in different directions by clicking and dragging (place the mouse cursor on the point cloud, press and hold down the **left mouse button**, then move the mouse while still holding down the left mouse button). Moreover, if you press and hold down the **right mouse button** you can move within your point clouds, e.g., from the right side to the left side. You can also zoom in using your touchpad (place two fingers on the touchpad and move them) or scroll wheel on your mouse.

8.3. Using the Segments Selector

Pointly's Segments selector tool will do most of the heavy lifting when it comes to fast and efficient labeling. You just need to select it and click on the objects you want to label.

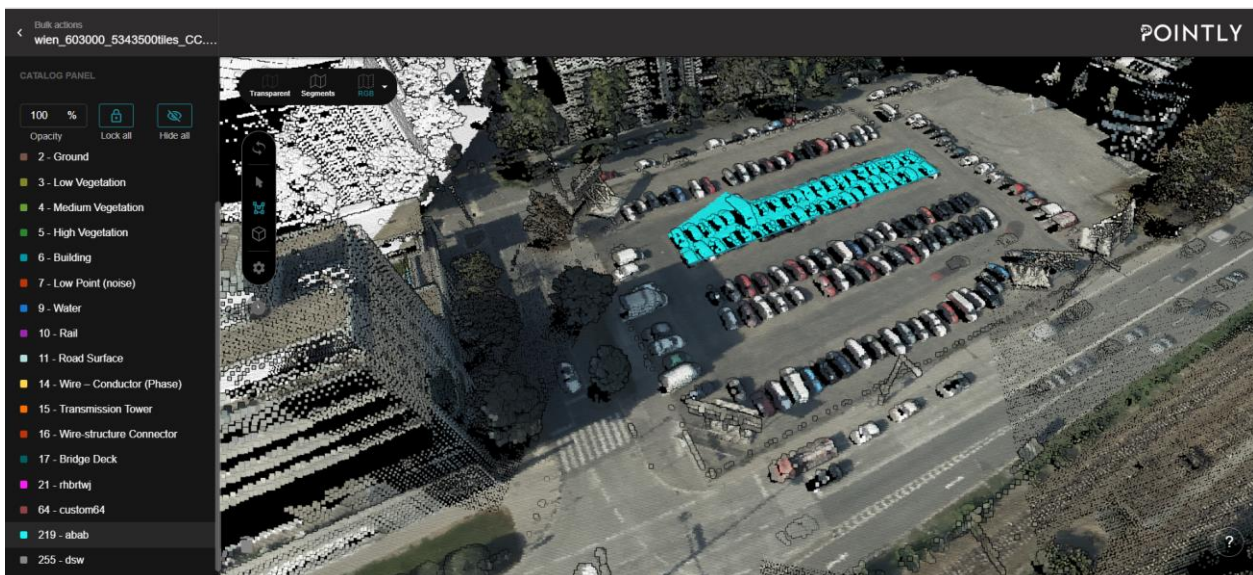
Quick tip: We recommend working with "Segments" view while using the Segments Selector as it will classify the objects based on the pre-processed segments.



8.4. Selecting objects with the Polygon Lasso Tool

As an alternative to the Segments Selector, you can use the Polygon Lasso Tool wherever you wish to adapt the segments.

Quick tip: after selecting the area with the Polygon Lasso Tool, you need to click with the right mouse button in order to finish your selection.



8.5. Working with the 3D Bounding Box

If you want to classify more tricky objects like trees, try using the 3D Bounding Box. With this versatile tool you can control the selection depth. Thus, you will be able to classify objects which are close to other objects, or which need to be separated in space.

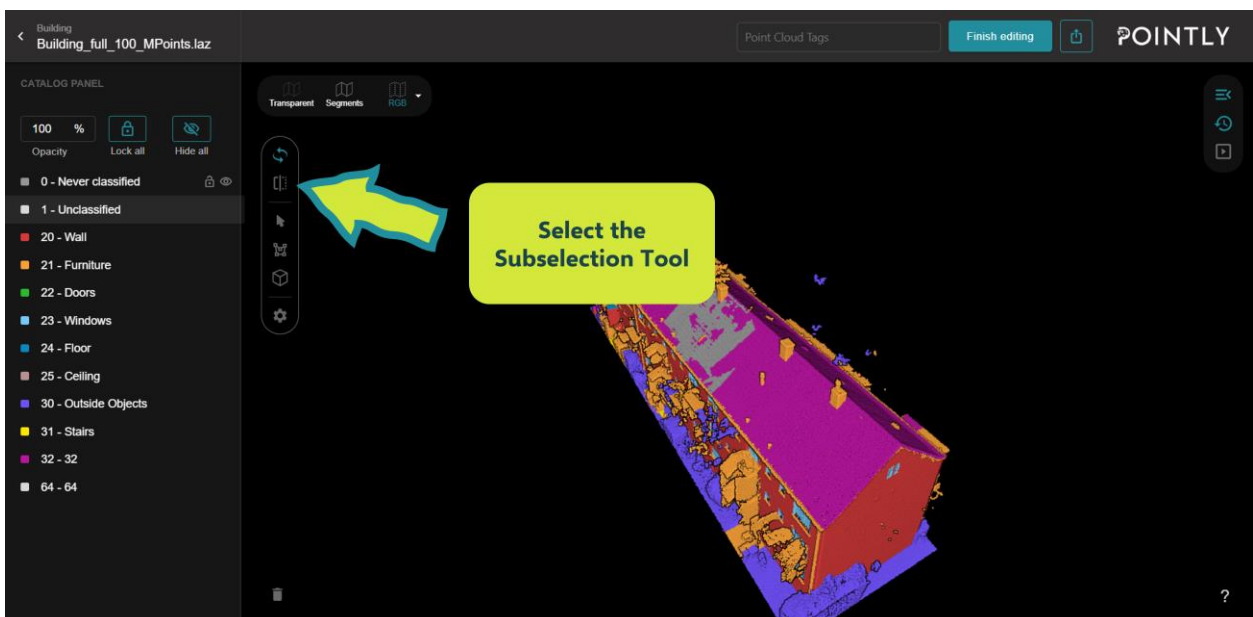
Place the box on the object you want to classify. You can rotate and move the box using dragging points so that you specify the area you want to classify. For that, you can also make use of the eye symbol on the 3D Bounding Box to change the view.

Quick tip: Finish your selection by clicking on the right mouse button.



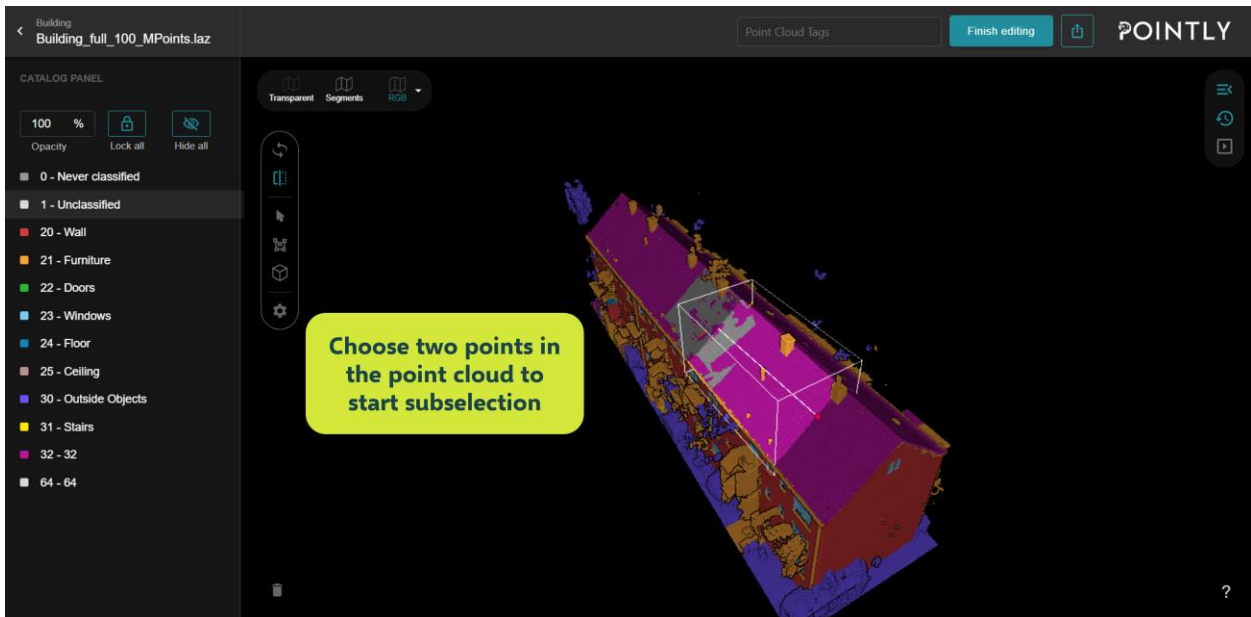
8.6. Using the Subselection tool

The **subselection tool** allows you to work only on a single section of the point cloud. It can be especially useful when working with indoor point clouds, and when doing manual corrections after using one of our Standard Classifiers. Subselection is currently not supported in Vector Editing mode.



Select the subselection tool in the toolbar, and you can place the first red point with a left click. This red point will be the start of the subselection, and don't worry, you can adjust it later. A

preview of the box will be shown, and you can place a second point with a left click.



After both points are selected, the **subselection view** will open on the left side of the Viewer. The **main view** remains on the right side.



Subselection can also be started by double left click instead of selecting points twice. The created box for subselection will be a regular cube centered at the point where you double click. Once subselection has started, the point cloud can be classified in the subselection view. The main view can be used to adjust what is visible in the subselection view. The box can be rotated and moved by using the dragging points like in the 3D Bounding Box tool for classification. Further ways to make working with subselection easier:

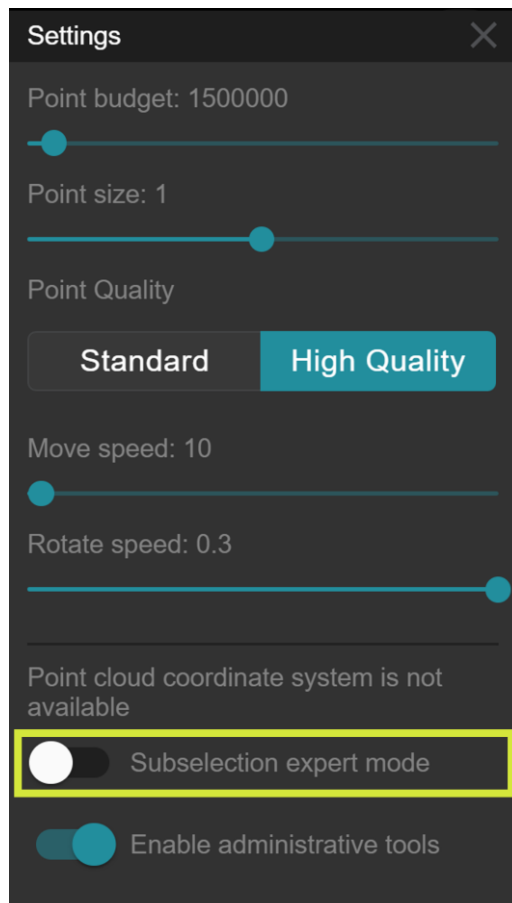
- Synchronize perspectives between subselection view and main view by clicking the [Synchronize views](#) button in the subselection view.
- Set the perspective with hotkeys:
 - Alt + T: top perspective
 - Alt + B: bottom perspective
 - Alt + P: profile view, front > left > right > back

When you are done working with subselection, close the subselection view.

8.6.1. Subselection expert mode

[Subselection expert mode](#) has been added to allow experienced users of Pointly or other 3D platforms to work with subselection more efficiently.

There is a toggle available in Viewer Settings to enable Subselection expert mode.



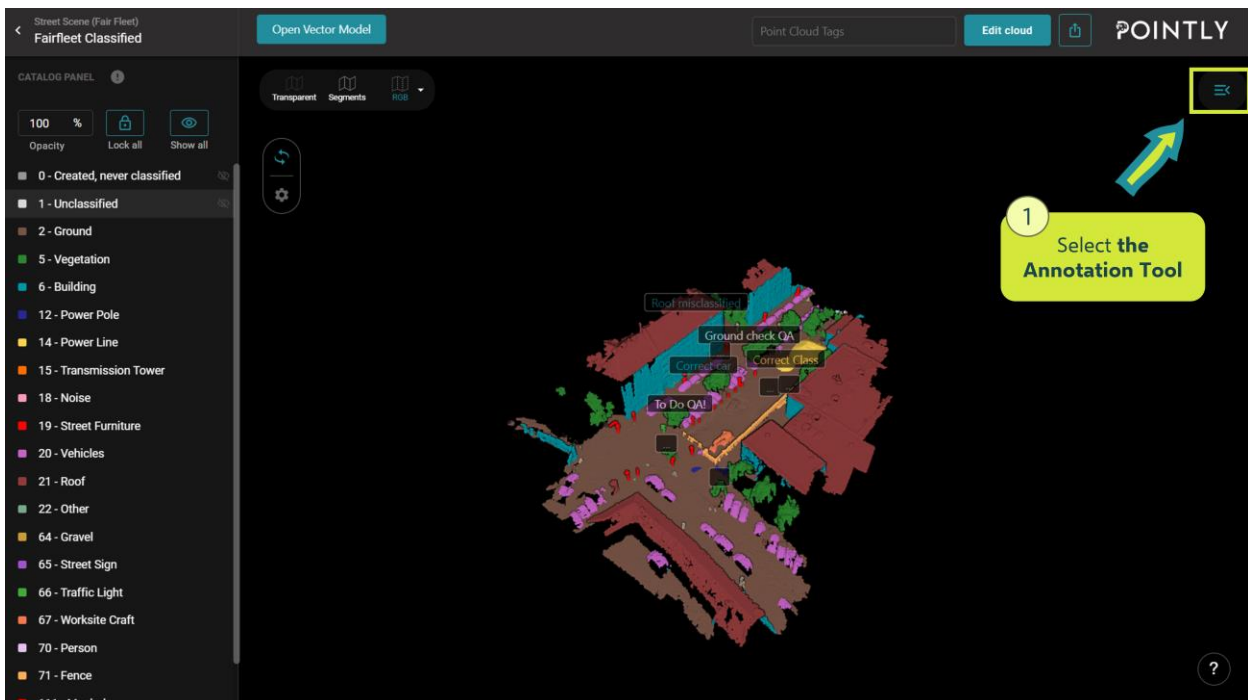
In expert mode, you can select the subselection area by left click and dragging. Releasing the left mouse button will not open the subselection view but allow you to make adjustments to the subselection area as needed. To open the subselection view after you are ready, click the right mouse button.

There is also a shortcut to close the subselection view by a double right click.

8.7. Using the Annotation tool

The annotation tool allows you to streamline the process of classifying a point cloud manually or correcting the results of the Pointly Standard Classifiers. With it you can add annotations directly to the point cloud, attach them to a location in the 3D space of the point cloud, and view and manage their status.

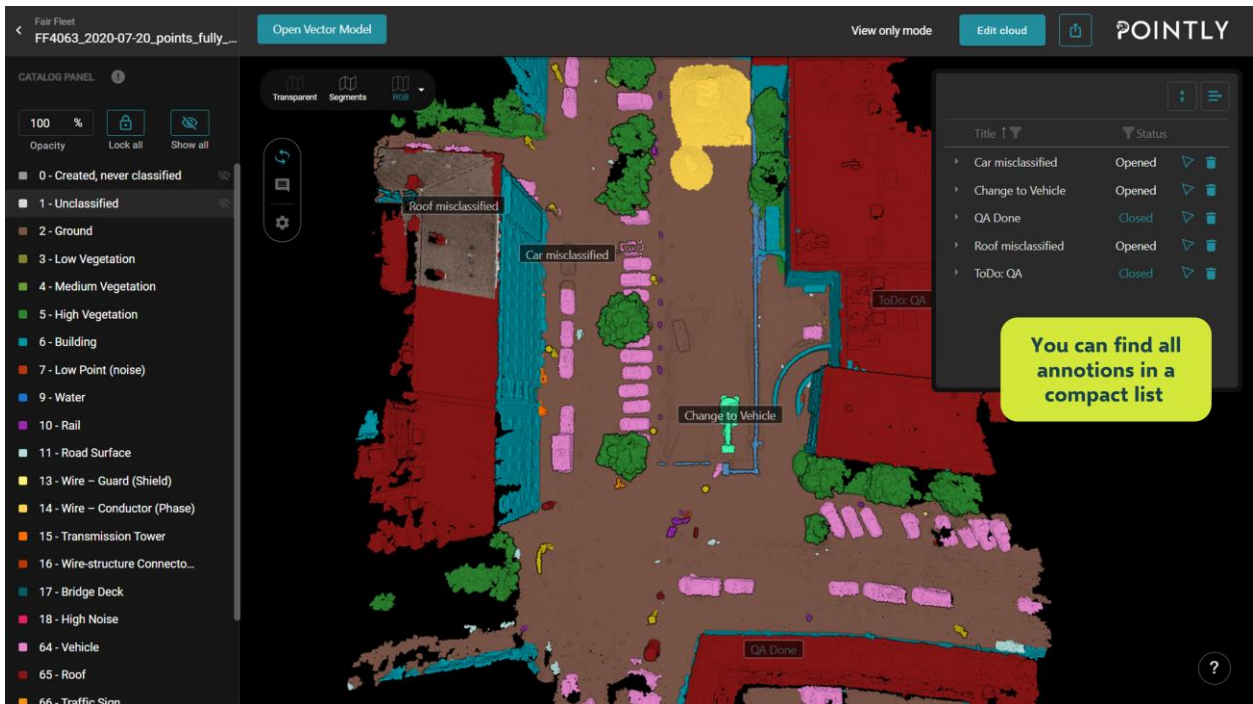
To access the annotation tool, open the point cloud you want to annotate and click “Edit Cloud” to enter Editing mode. Select the annotation tool from the point cloud editing toolbar, which is visible on the left side of the Viewer.



After selecting the Annotation tool, the Annotation Explorer will appear on the right side of the Viewer, displaying all annotations in the point cloud in a compact list.



To make an **annotation**, use the left mouse button to click on a point in the point cloud. This places the annotation in the same coordinates as the point.

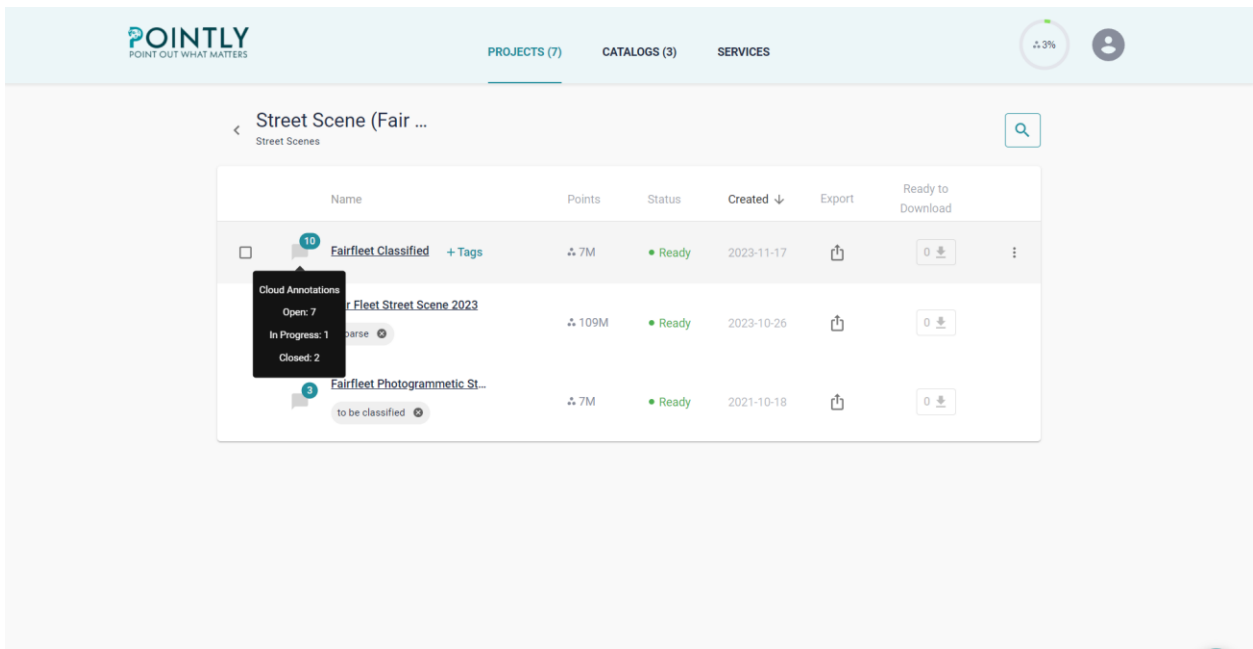
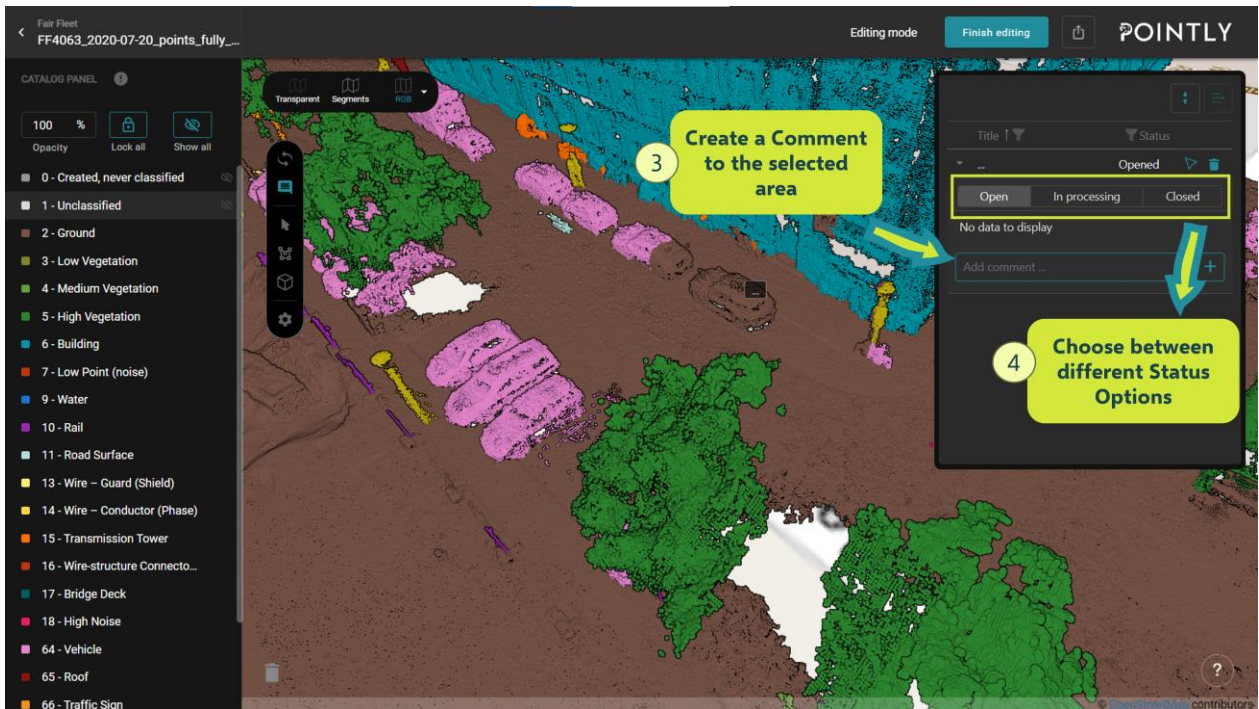


After placing the annotation, you can edit it in the Annotation Explorer on the right side of the Viewer. You can give it a name, add comments and choose one of the three status options. Each status option is color coded and will be applied to where the annotation is visible in the Viewer.

The statuses and their colors are as follows:

- Open (blue),
- In processing (yellow),

- Closed (white).



You can directly see in the project when there are annotations in a point cloud.

8.8. Using the Add Vector Data Tool

The Add Vector Data tool enables users to verify the results of point cloud classification using vector data files provided by the user. The purpose of this tool is to overlay objects from the vector file onto the point cloud for an additional reference and quickly identifying potential

classification flaws. For example, it is possible to upload building contours obtained from various sources, such as Open Street Map, to validate classification results.



8.8.1. File Submission Guidelines:

File Format:

Format Requirement: GeoJSON

Accepted Objects Types: Points, Linestrings, Polygons, Multipoints, Multilinestrings, and Multipolygons are supported.

File Size Limitation: There is no size limitation, but it is recommended to upload files up to 50MB in size for optimal performance. Larger files may affect processing speed.

Coordinate System Compatibility:

Requirement: The default CRS by GeoJSON is the WGS84 datum or CRS must coincide with the CRS of the point cloud.

Convert Mechanism:

- If the GeoJSON file's coordinate system is not specified, it will automatically be aligned with the WGS84 coordinate system.
- If neither the GeoJSON file's nor the point cloud's coordinate systems are specified, converting the CRS is not possible. Consequently, the objects from the file will likely not overlap correctly with the point cloud, resulting in improper display on the platform.

Display Condition: Only objects from the GeoJSON file that overlap with the specified point cloud will be displayed. Objects that do not overlap due to coordinate system mismatch may not appear.

Upload Process:

Single File Upload: One GeoJSON file at a time.

Session Persistence: Please note that displayed file information will not be saved beyond the current session. It is needed to re-upload the file after refreshing the webpage or starting a new session.

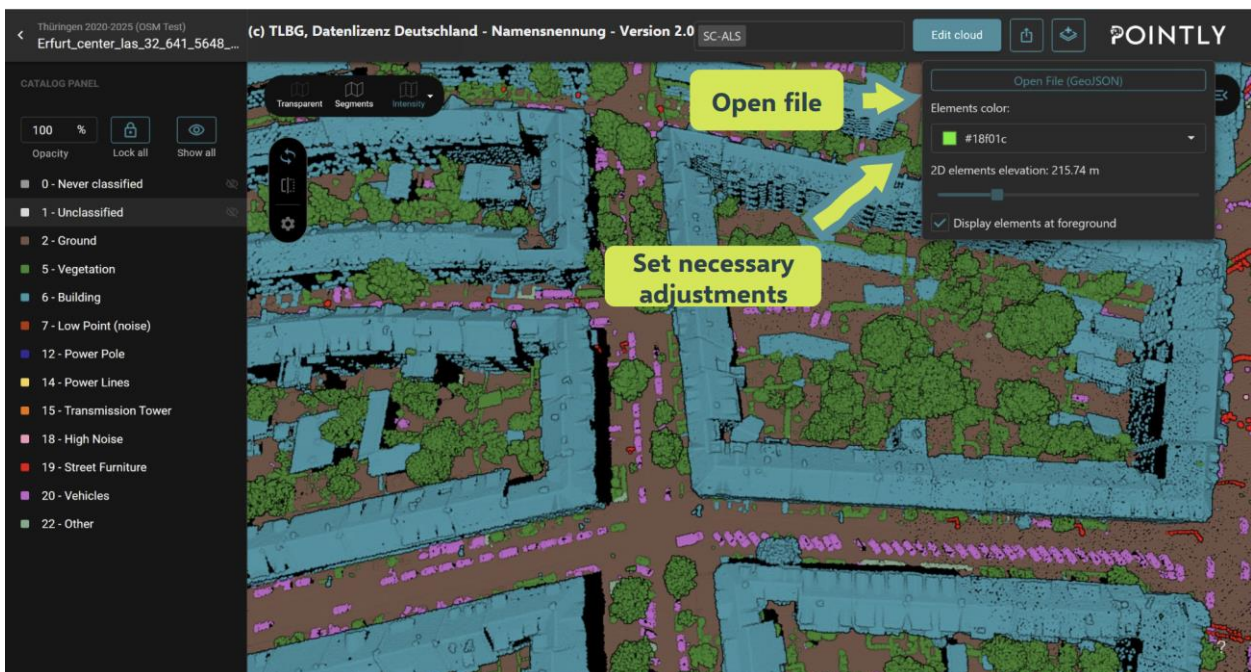
8.8.2. Object Display Settings

There are helpful tools designed to enhance control and flexibility when working with vector files, ensuring accurate visualization and manipulation as needed:

Colors: Elements from the vector file can be customized to any color according to specific needs. Bright colors are recommended to obtain a good contrast to the classification colors.

Elevation Adjustment for 2D Elements: The elevation of 2D elements can be manually lifted within Z-coordinates of the point clouds.

Foreground Display Option: This feature allows users to display objects in the foreground, ensuring elements are always visible regardless of their position.

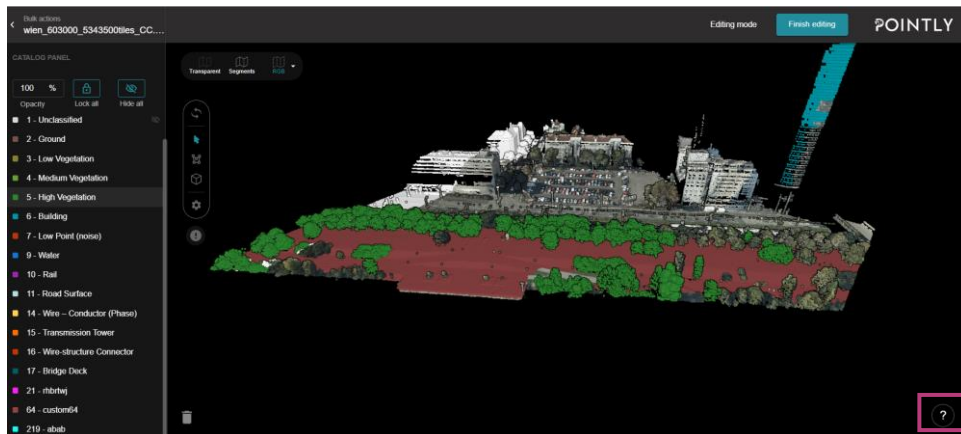




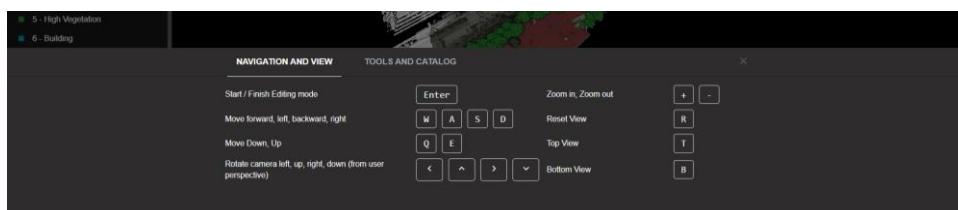
9. Keyboard Shortcuts in the Viewer

Keyboard shortcuts were developed to improve the classification experience in the Viewer. They allow you to rotate the cloud, move through it, change the angle of the view, switch between different tools and classes, and more. The mouse can still be used in addition to the keyboard shortcuts.

To see the available hotkeys while in the Viewer just press **?** in the left corner.



You will see the full list of available keyboard shortcuts.



9.1. Navigation shortcuts

Navigation hotkeys help you to move and rotate the cloud so that you can carefully check and label all the details from different angles.

Hotkeys	Description
W, A, S, D	Move forward, back, left, right
Q, E	Move Down, Up
←, ↑, →, ↓	Rotate view left, up, right, down
+, -	Zoom in, zoom out
R	Reset View
T	Top View
B	Bottom View

Some of these shortcuts can be used simultaneously. For example, you can combine **W** and **→**, **S** and **+**, **W** and **D** etc.

A good point is that you could move through the cloud and rotate the camera from the user perspective.

Keep in mind that navigation shortcuts listed in this section are disabled when you are labeling with Polygon Lasso or 3D Box. You need to cancel the process or complete that action to continue moving the cloud.

9.2. Tools Management

Tools management keyboard shortcuts allow you to change tools while you are labeling.

Hotkeys	Description
Enter	Start/ Finish Editing mode
Tab	Switch between labeling tools (Segments Selector, Polygon Lasso, 3D Box)
Esc	Cancel in progress action (Polygon lasso, 3D Box)
L	Lock/ Unlock all classes
H	Hide/ Show all classes

9.3. Catalog Management

These hotkeys help you to switch between classes quickly.

Hotkeys	Description
---------	-------------

0,1, ..., 255	Switch between classes
U, I	Previous class, Next Class

Keys **U** and **I** switch you to the previous or next class accordingly.

Another option to change the class is simply typing its ID using keyboard digits. Good to know that in this case the class is switching on the fly as the user is typing. For example, you would like to choose class with ID 34: first you type 3 - class with ID 3 is immediately chosen, then 4 - class 34 is chosen. Please note that your class will remain as it was before the change if you type an incorrect number.

10. Custom tags for point clouds

Custom tags for point clouds are free text fields, to tag the point cloud and/or comment on the point clouds to categorize them. For example, you could tag all point cloud that have the same characteristic with the same tag, like "LiDAR".

Applies to:
To all accounts

For single or several point clouds at once, freely defined Tags can be added. They can be used to assign tasks to people, to document a status or to add other meta data to the file.

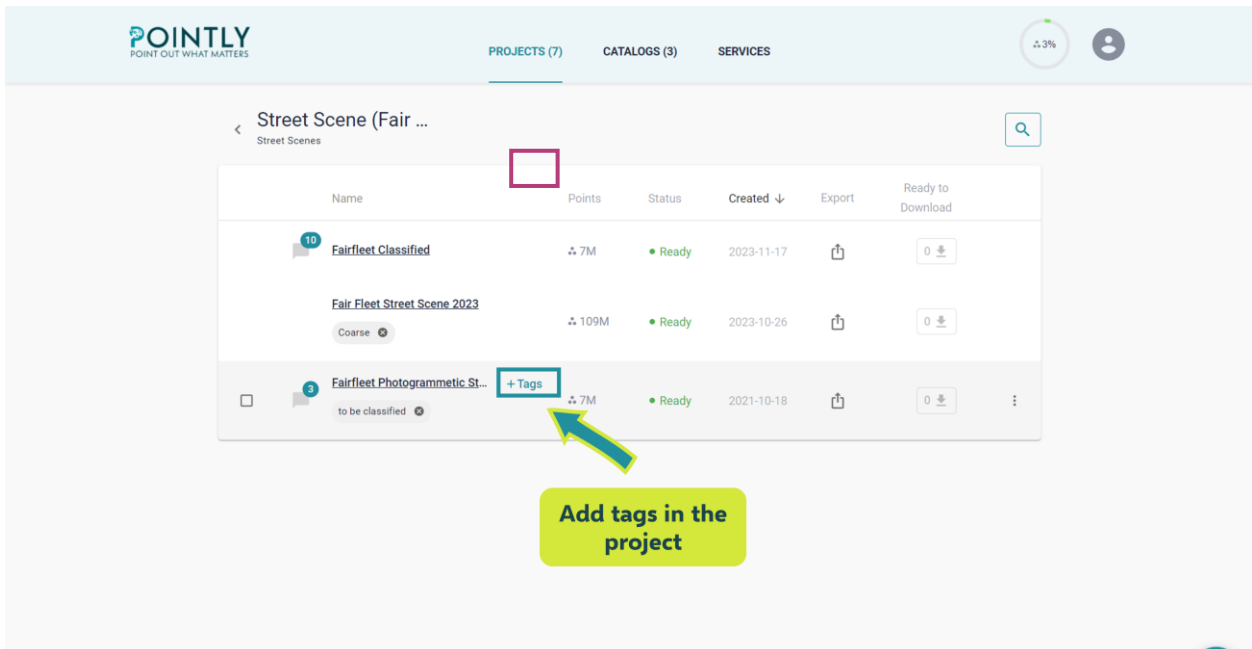
Tags are searchable, so you can filter the list of point clouds for a specific person, status etc.

10.1. Add and remove custom tags

Tags are available both for Free and Professional Accounts. For now, adding tags is possible on point cloud level only.

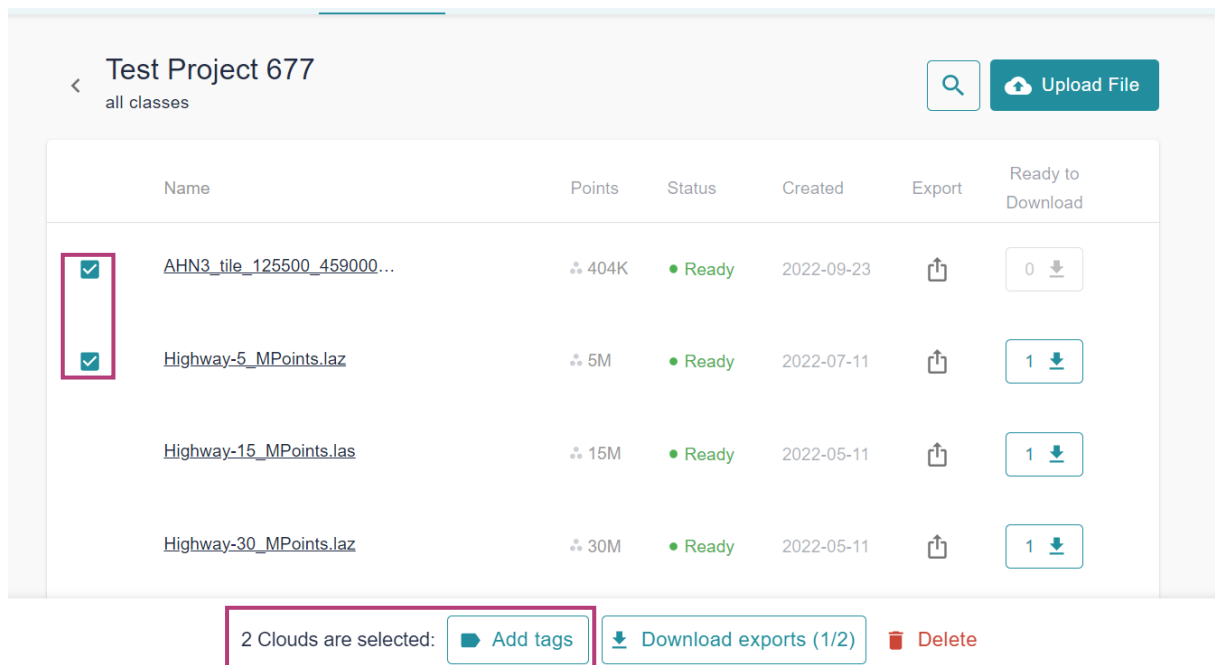
10.1.1. Add Tags

There are a few ways to add tags. The first one is for a single cloud. Just hover the cursor over the cloud and then click **+Tags** to open the pop-up to add tags.



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The second option enables adding tags to multiple clouds. For that you can click the checkboxes for the desired files and then click button **+ Add tags** to open the pop-up. You can always see the number of selected clouds near this button.



To select all clouds in the project simply check the checkbox in the header. By unchecking it you would unselect the clouds.

Test Project 677
all classes

Upload File

<input checked="" type="checkbox"/>	Name	Points	Status	Created	Export	Ready to Download
<input checked="" type="checkbox"/>	AHN3_tile_125500_459000...	404K	Ready	2022-09-23		0
<input checked="" type="checkbox"/>	Highway-5_MPoints.laz	5M	Ready	2022-07-11		1
<input checked="" type="checkbox"/>	Highway-15_MPoints.laz	15M	Ready	2022-05-11		1
<input checked="" type="checkbox"/>	Highway-30_MPoints.laz	30M	Ready	2022-05-11		1

25 Clouds are selected: Add tags Download exports (6/25) Delete

10.1.2. Add Tags pop-up

To open the pop-up, use one of the options described above. When the pop-up is open, write a tag and use the Enter or Tab buttons to confirm it. Keep in mind that you can add up to 50 tags for a cloud. The length of a tag is limited to 20 symbols. Then press the Save button to add the tags to the point cloud(s).

Airborne Scans

Add tags ✕

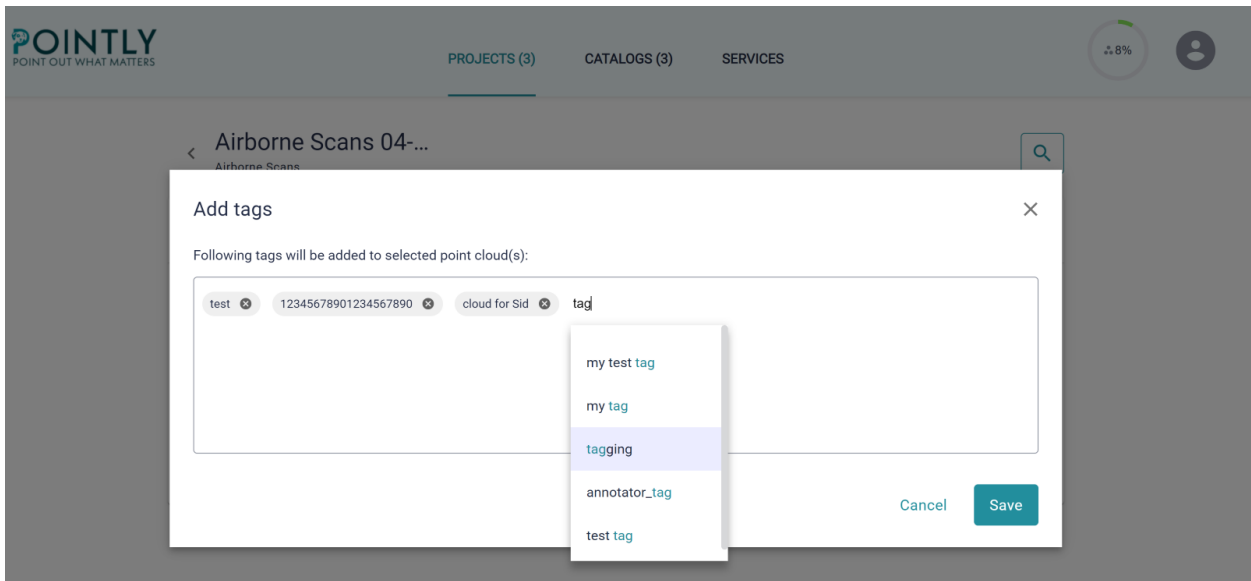
Following tags will be added to selected point cloud(s):

mtfnkw ✕ test ✕ Berlin ✕ Add new tag

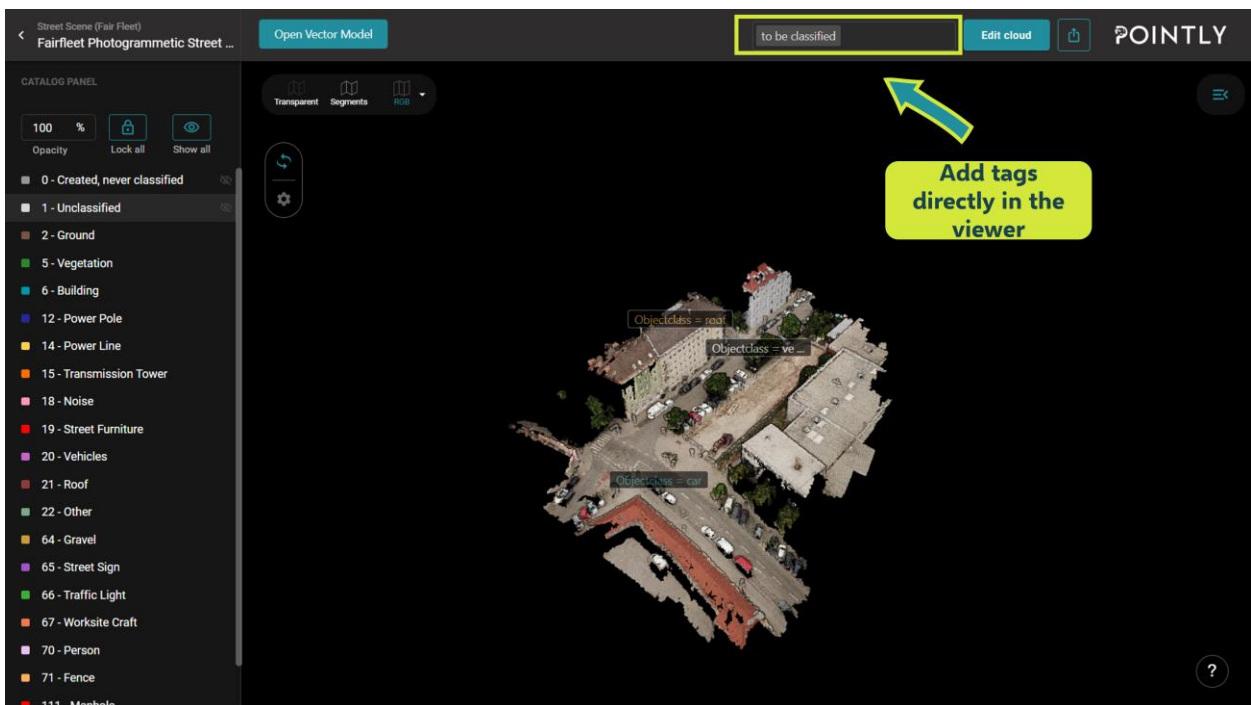
Cancel Save

Please note that copying a tag from elsewhere in the tags will not work as expected. In case you paste a few different words, it would be counted as one tag. If the length is longer than allowed, the text will be trimmed.

There is no need to think about duplicated tags because the system checks it for you. Additionally, the autofill option will suggest tags in case there are tags with matching text.



10.1.3. Add tags directly in the viewer



Besides the option to add tags in the project, you can also add tags directly in the viewer. Therefore, just add your tag in the top right corner and press “Enter”.

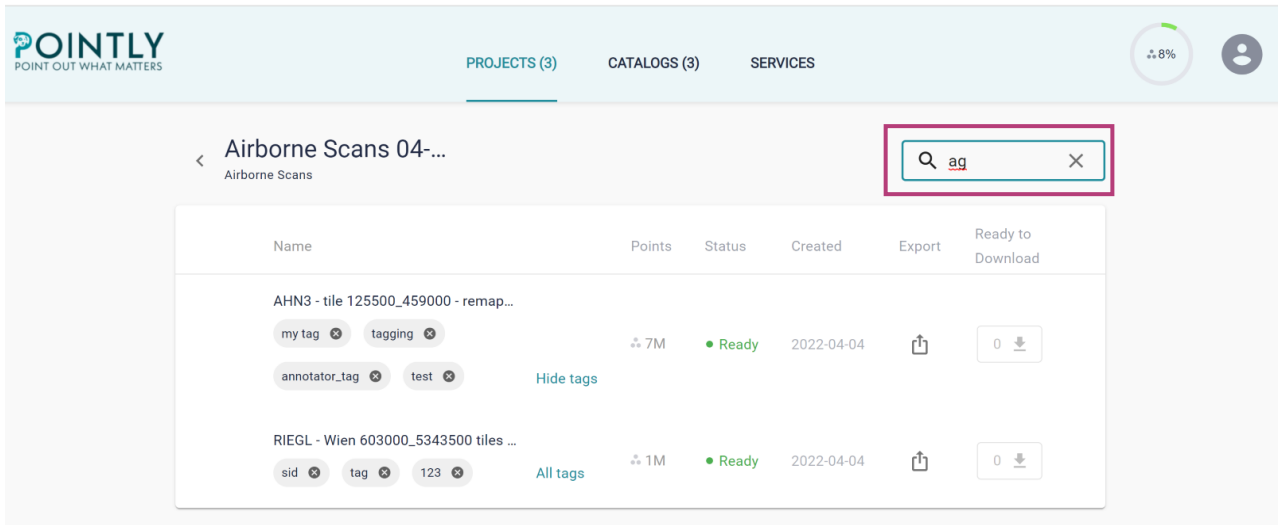
10.1.4. Remove tags

To remove tags just click the “X” sign behind a tag. It’s as simple as that!

10.2. Search by tags

There is the option to search by tags, in addition to searching by name and date.

Just click the search icon and enter the tag or a part of it. You will be shown all the matches for your request.



11. Downloading point clouds

Applies to:

Professional + Annotator Account

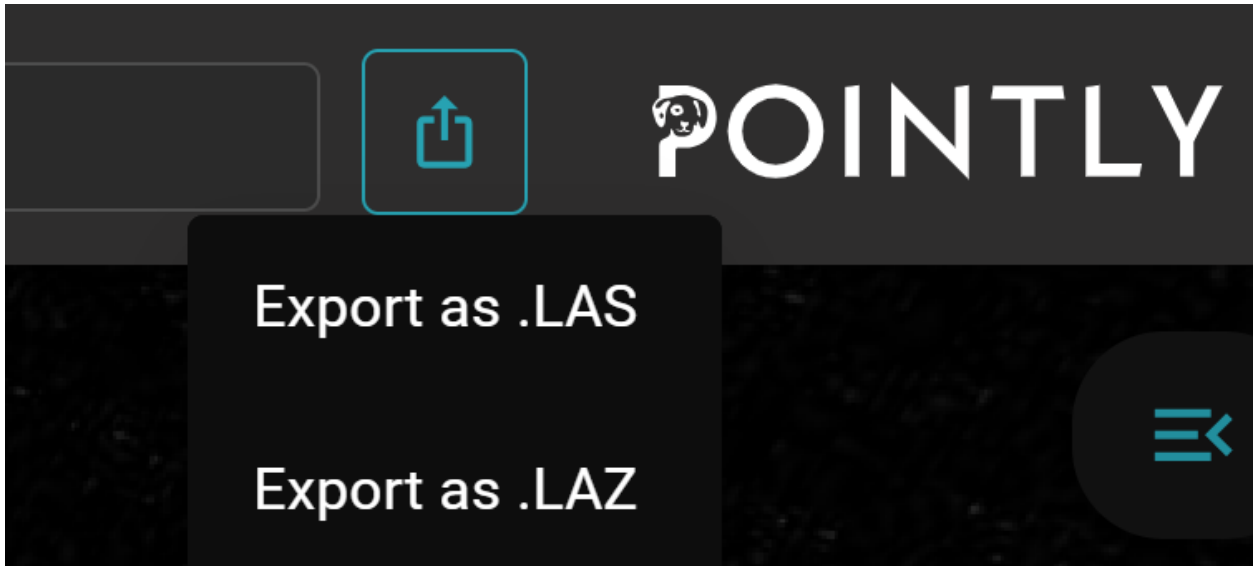
To download a point cloud from Pointly, there are two separate steps in the process. Step 1: an export of the point cloud must be triggered, which will combine all commands applied to the point cloud into the original cloud and allow you to use the processed point cloud outside of the platform. Step 2: once the export is processed, the point cloud is ready to download and a download to your local machine can be started from the Pointly platform.

11.1. Exporting point clouds

There are two ways to trigger the export of a point cloud: from the Viewer and within the project page.

11.1.1. Exporting from the Viewer

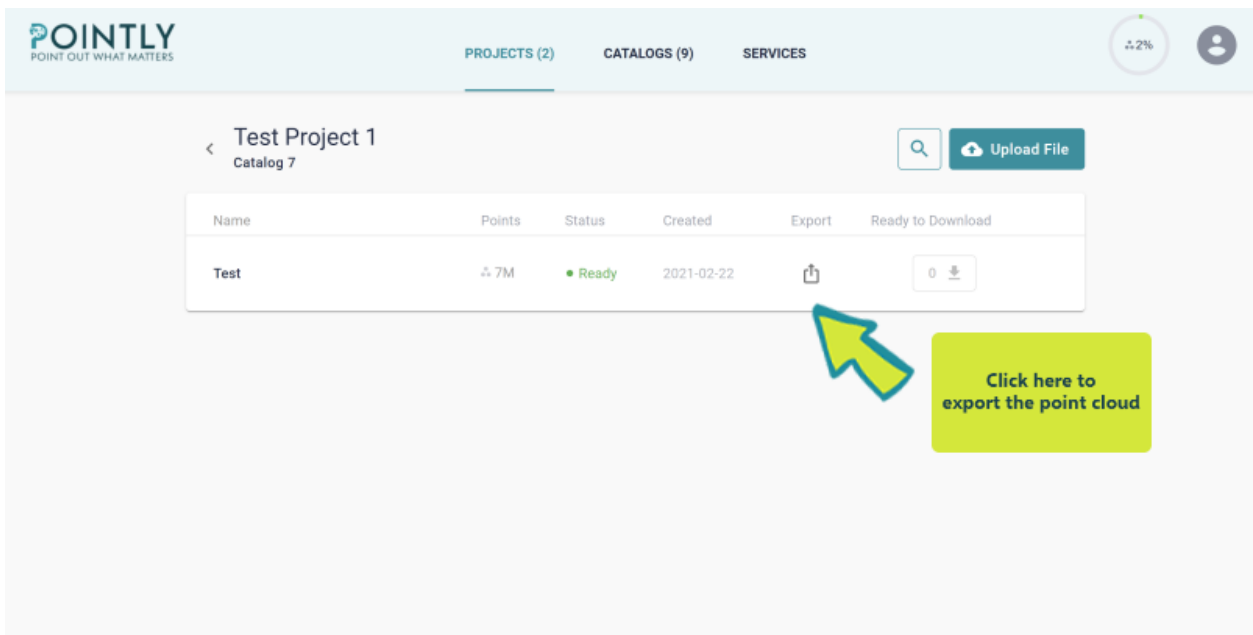
You can trigger the export of a point cloud directly in the Viewer. To do that simply to press the button in the upper right corner and select the desired format (LAS or LAZ).



The export button will be inactive when an export is already in progress or if the existing export is up to date.

11.1.2. Exporting from the project page

The second place to trigger exports is from within the project page. To export a point cloud, click the icon next to the cloud's name on the project page.



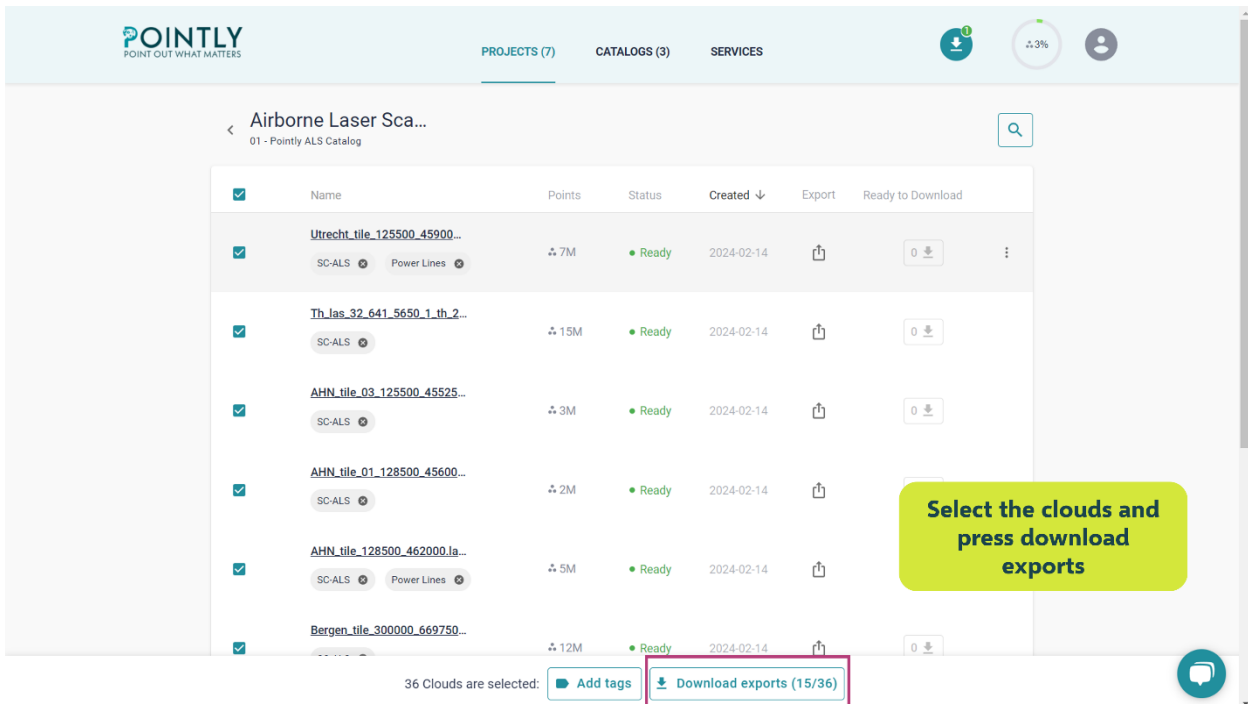
11.1.3. Bulk export

To export and download multiple files, you can use the bulk export functionality. This allows to:

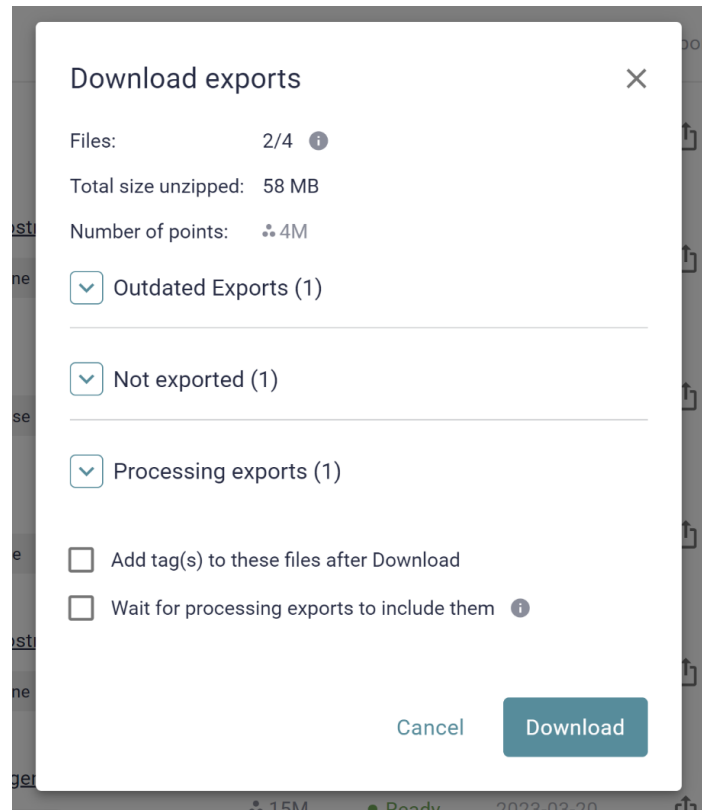
- Generate export for the selected point clouds,
- Update outdated exports,

- Include exports in progress in the ZIP.

To generate or update export for multiple point clouds, you should select the clouds and press **Download Exports** button.



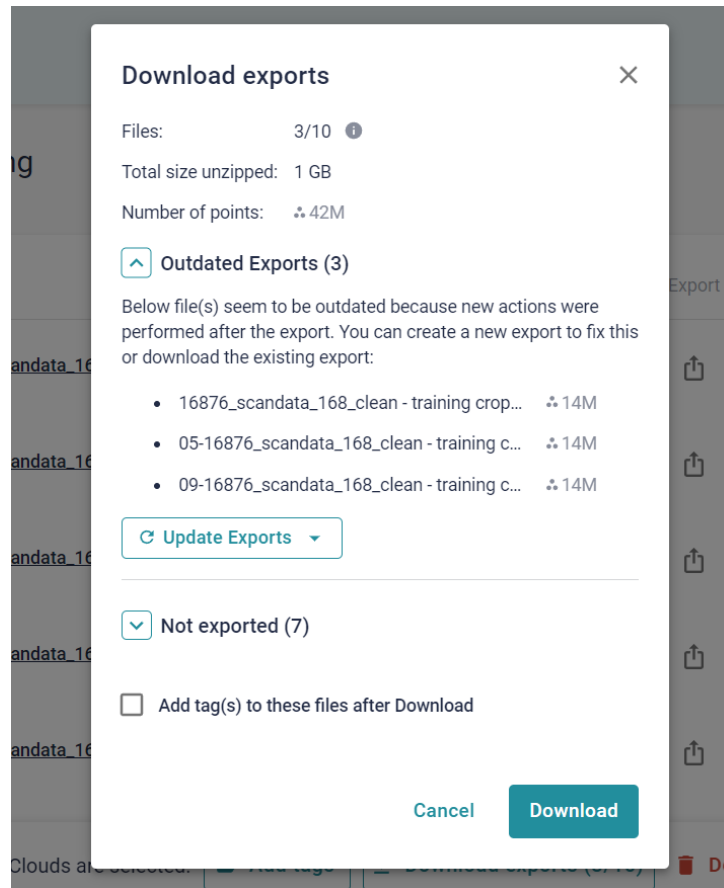
Once the button is pressed, you will see a pop-up with general information about your download such as number of files, total size of unzipped files and total number of points. If any of the selected clouds have an outdated export, export in processing or no export at all, then the corresponding sections will be present in the pop-up.



Clicking on each section you can see more details about the clouds with exports in this category.

Outdated exports

This category includes the point clouds with new actions performed after the last completed export. To update outdated exports, click the "Update Exports" button in the "Outdated Exports" section and select the desired export format.

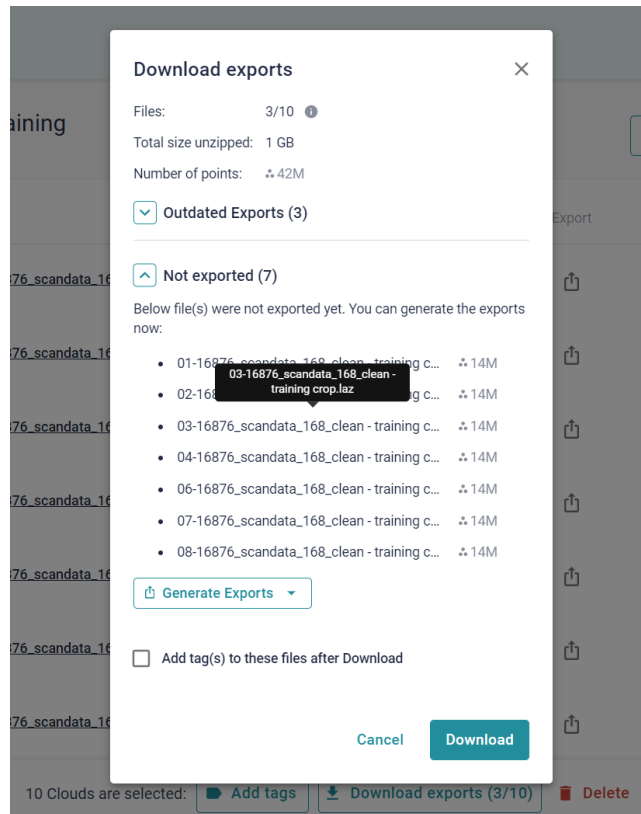


An export is considered outdated if one of the following holds:

- the catalog was reassigned,
- a class was deleted,
- a class ID was updated,
- at least one labeling command was canceled or added,
- all classifications were deleted,

Not exported

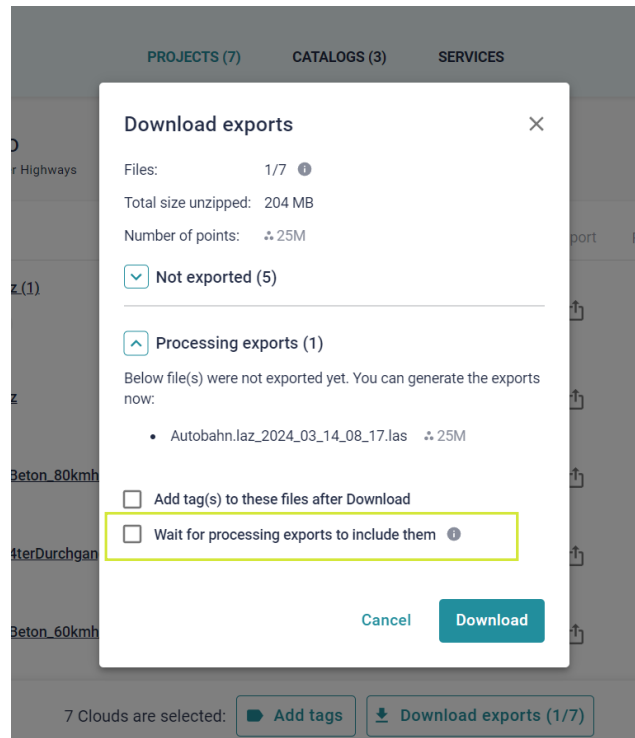
This category includes clouds which have not been exported yet. For point clouds where no export has been triggered, they need to have status Ready (not Failed or Processing). This category also includes point clouds with failed exports.



To trigger the exports for clouds in this category, click “Generate Exports” button in the “Not Exported” section of the menu and select the desired format.

Processing exports

This category includes clouds whose export is currently in progress. They can be included into the bulk export and download. After clicking “Update Exports” or “Generate Exports: button, the respective clouds are moved to this category.



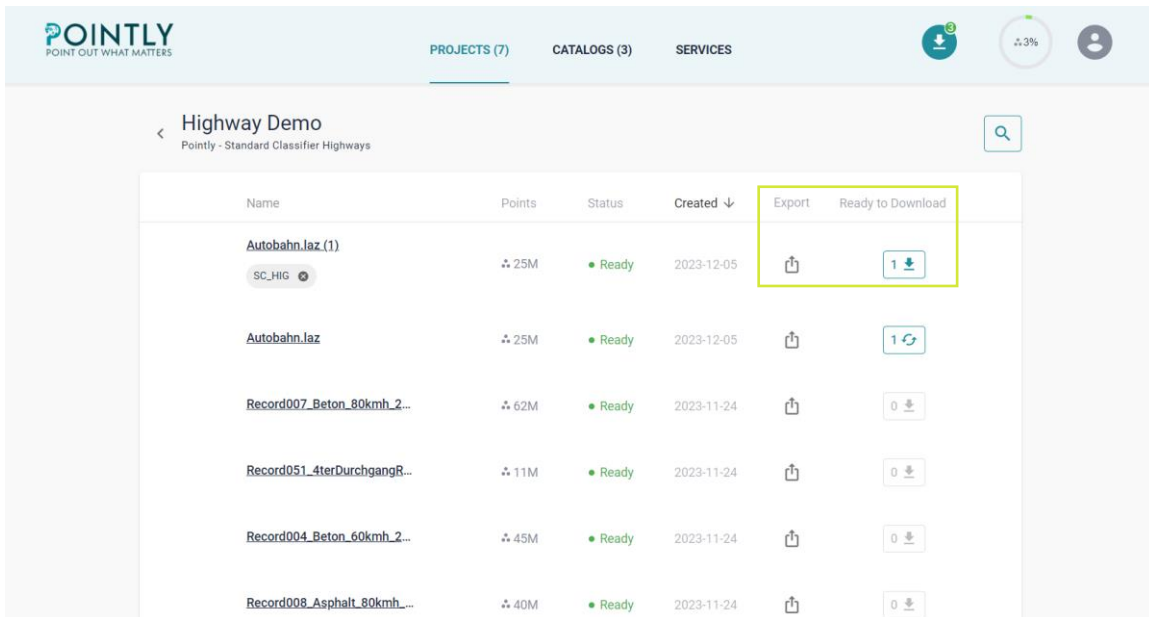
In order to include these exports into the ZIP file which will be generated, check the "Wait for processing exports to include them" checkbox. A ZIP file will be created after all files have been exported successfully. The action might be cancelled if a newer version of the export is created.

11.2. Downloading exported point cloud

Downloading the exported point clouds is possible in two ways: downloading a single exported point cloud, or multiple exported point clouds, also called bulk export.

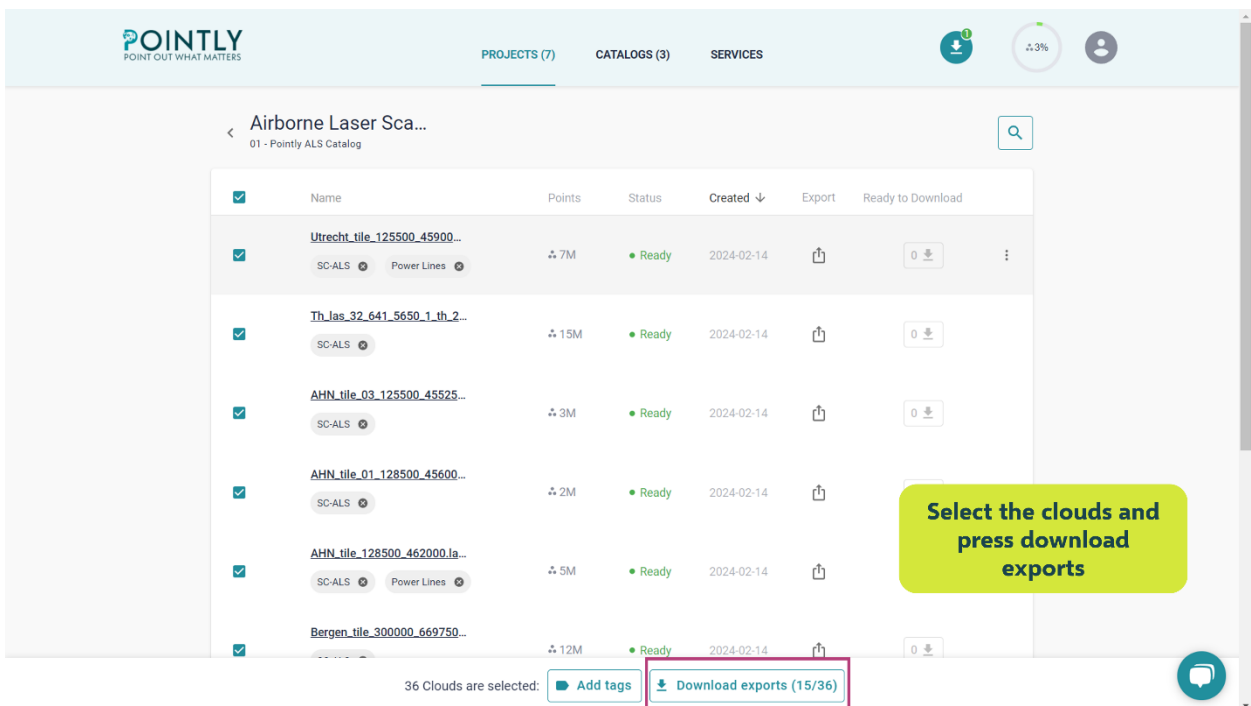
Single export download

In order to download a single exported point cloud, first make sure that the export is finished processing successfully. Click on the button in the "Ready to Download" column and download the file by clicking the link which appears.



11.3. Bulk export download

This feature allows you to download multiple successfully generated export files from the same project as one ZIP file. To download multiple exports simultaneously, you should select the clouds and press Download Exports button.



As discussed in [Bulk export](#) here you can trigger a bulk export. In case more exports are processing, and you have checked the "Wait for processing exports to include them" checkbox your ZIP file will be ready after they are processed.

Also, you can always tag these clouds to easily identify them later in the project. Just check the checkbox “Add tags” and an appropriate field will appear after you press Download button. Once all the selections are done and you are ready to download the files, click the “Download” button in the lower right corner.

It is important to note that downloading will not start immediately, as first ZIP file should be generated. The processing time depends on the number of clouds and their total size. You can always check the progress in the Download Manager.

12. Multi-User / Project Sharing

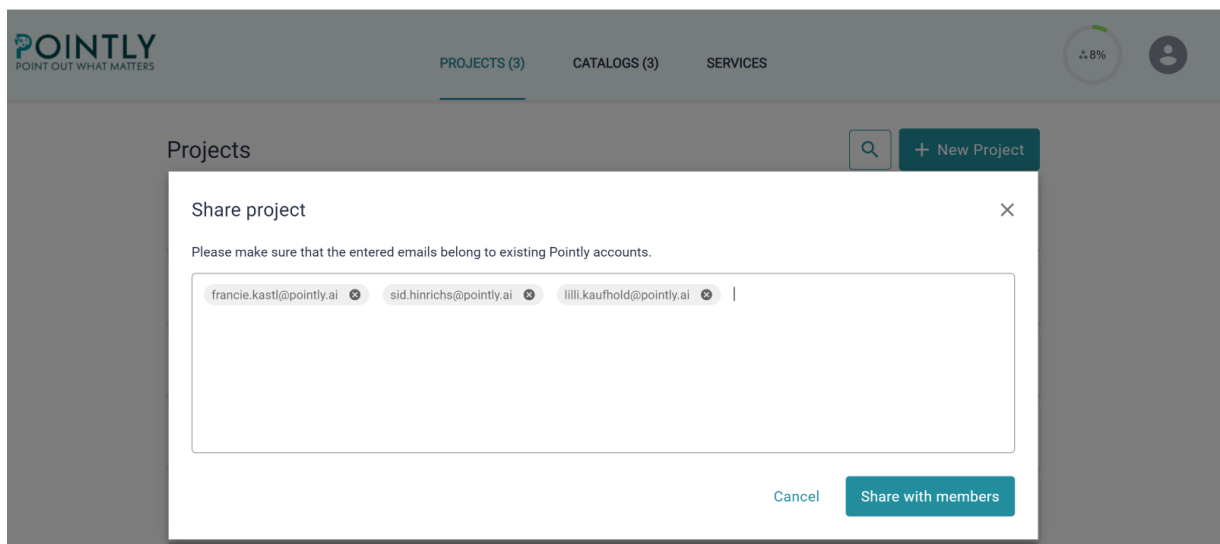
12.1. What can I do with the Professional Account?

With a Professional Account you can share projects with Annotator Accounts or other Professional Accounts.

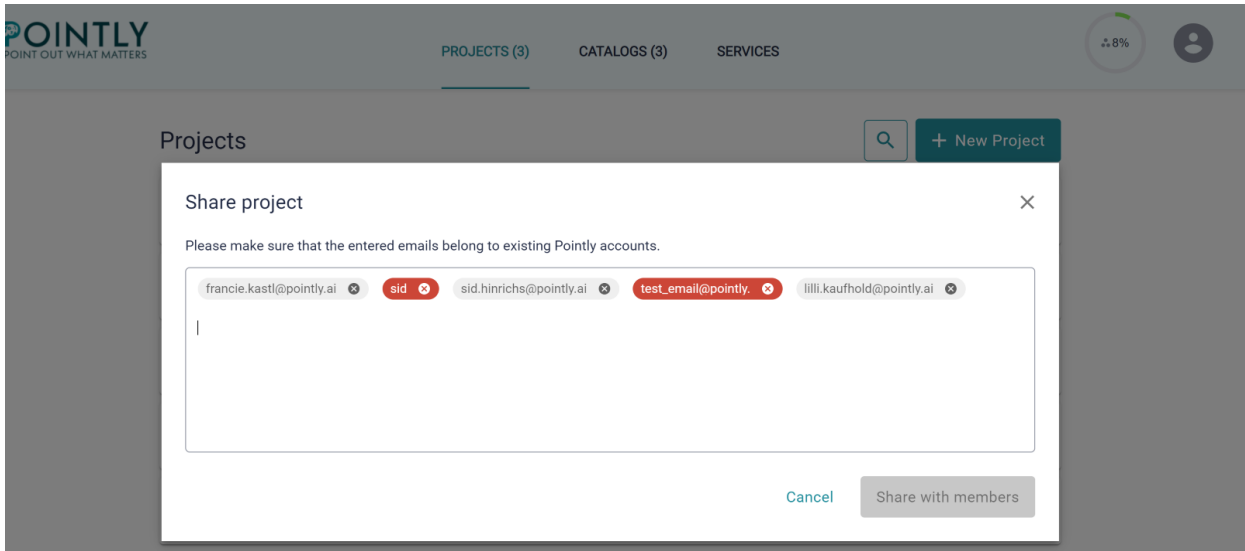
Being a project owner (the person who shares the project) gives you a possibility to manage the project. Keep in mind that only the project owner can rename and delete the project and its clouds, upload new clouds and edit or change the project catalog (label catalog).

12.2. Share the project

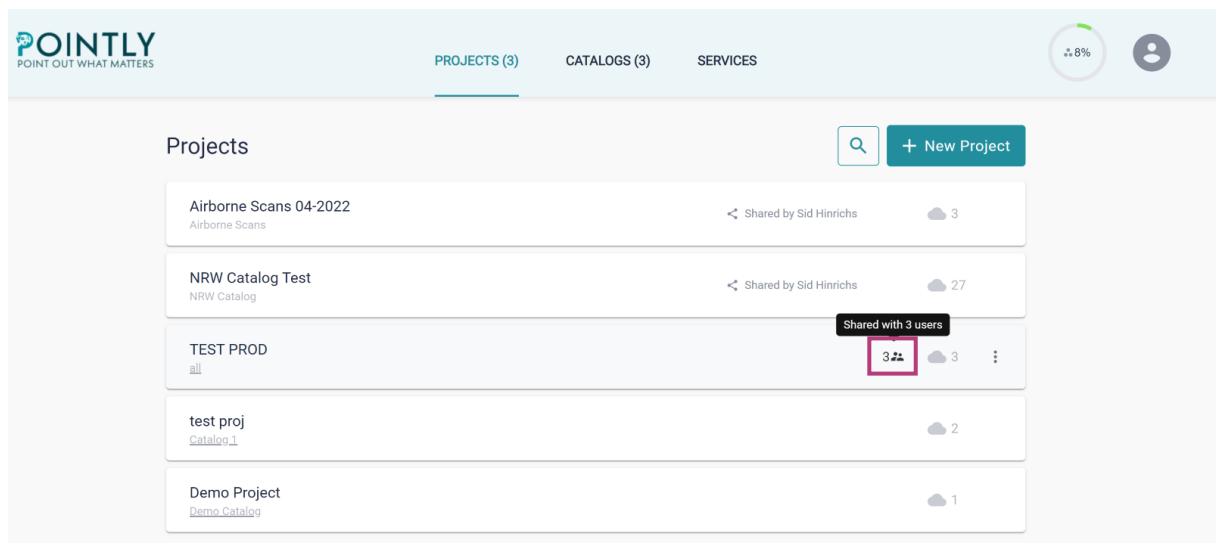
To share the project simply click the three dots button to open the menu and then click on **Share project**. A pop-up will appear where you can enter or paste emails of the users that you'd like to grant access.



In case there's an incorrect email, it will be highlighted. You need to remove the incorrect email to be able to proceed and share the project. Otherwise, the **Share with members** button will be unavailable.

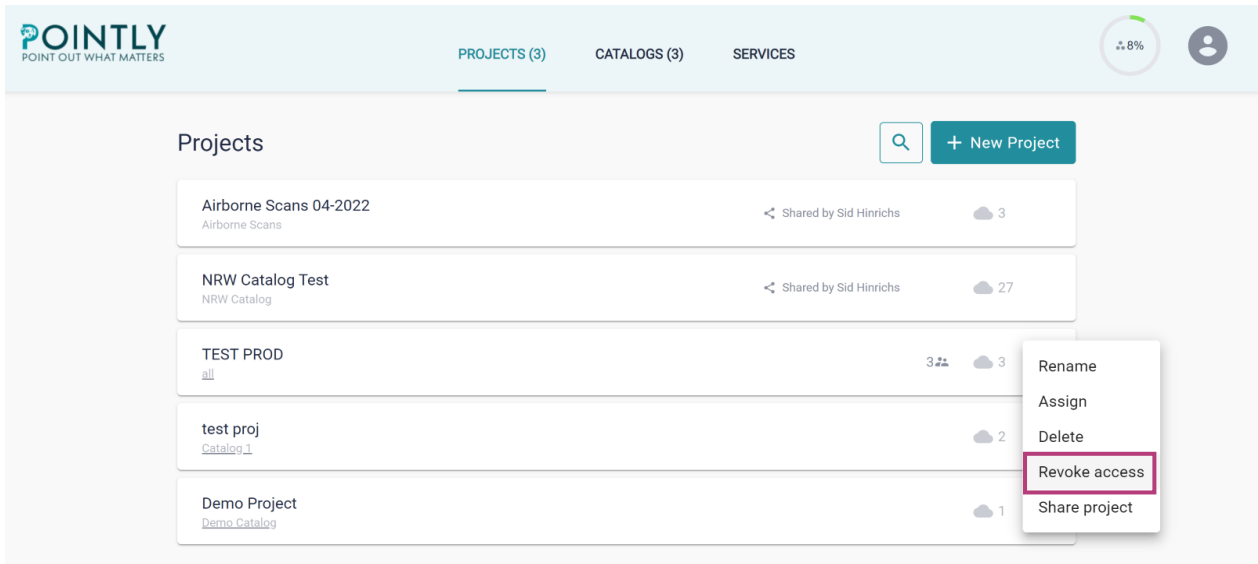


Projects can only be shared with already registered users. When the project is shared, a new icon will appear that shows the number of shared users. You can click this icon to see the list of accounts that have access to the project. If an email is missing in the list, make sure that the corresponding Pointly account was already created and that the email was spelled correctly while sharing the project.



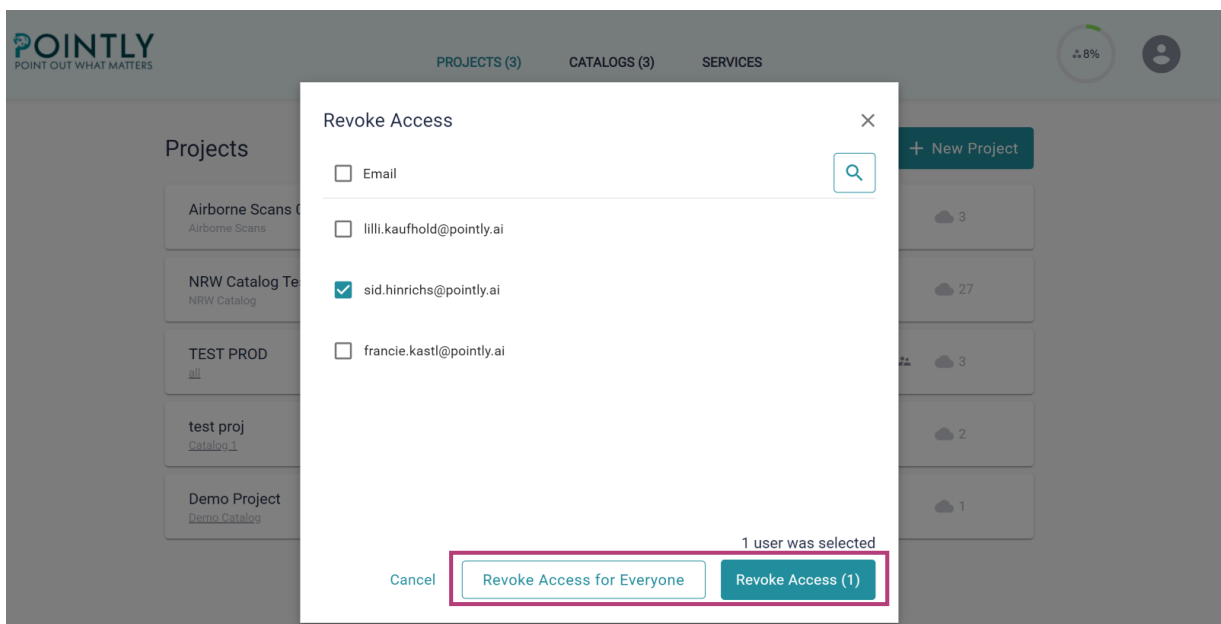
12.2.1. Revoke access

You can easily revoke access for a single or multiple users. To open **Revoke access** pop-up, you can click on three dots and then select the needed option in the menu or simply click on the icon that shows you the number of shared users.

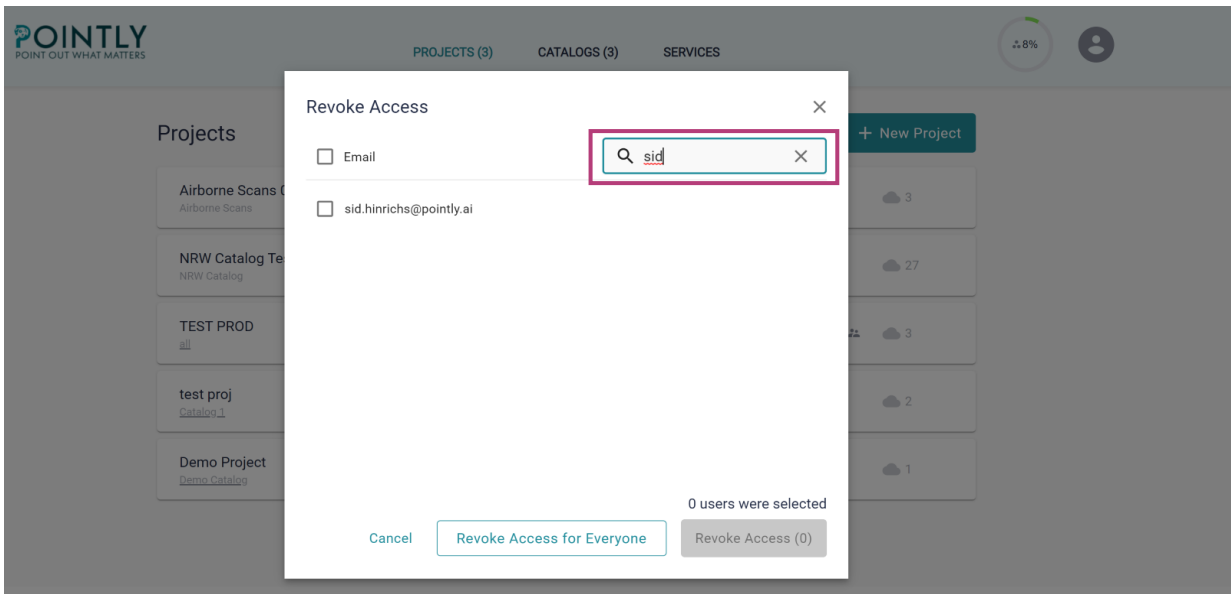


To delete the user from the list you need to select him by checking the appropriate checkbox and then press **Revoke Access**. You can always see the number of selected users above the action buttons.

To revoke access for the whole list at once simply click **Revoke Access For Everyone**.



There is an option to search for a particular email address if the list is too long.



12.3. What can I do with the Annotator Account?

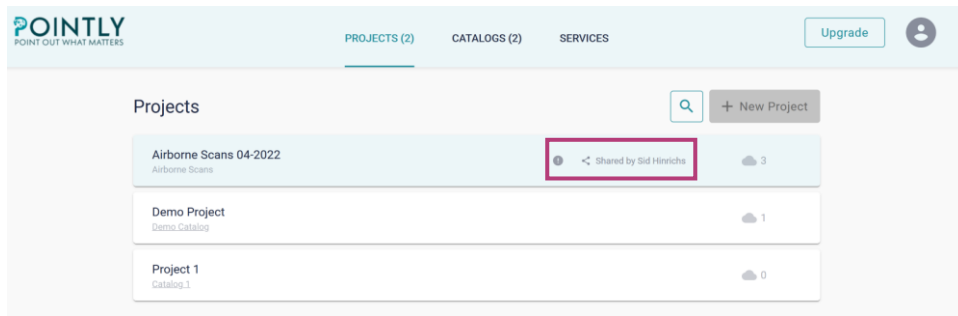
The Annotator Account is only available in combination with a Professional Account (S, M or L). To one Professional Account as many Annotator Accounts as you like can be added.

Annotators can access, view, classify and export point clouds in projects that are shared with them. Also editing tags is possible. As an Annotator you can't upload or delete point clouds and projects. You don't have access to edit the project catalog or see it unless you are in Viewer.

Quick tip: You can give an Annotator Account to your clients to share the projects with them.

Project can be shared with any person that is registered as a Pointly user. Shared projects do not require additional upload or storage space for the shared users.

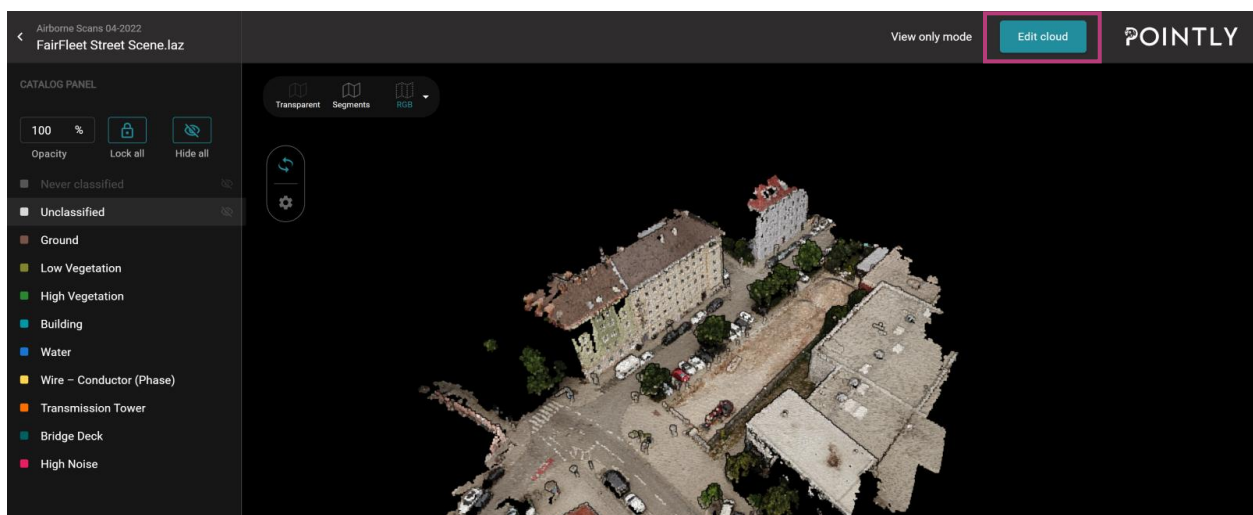
In case a project was shared with a Free Account, the user won't be able to open the project and edit clouds. The project will still be listed for the user and becomes only available as soon as account is upgraded to Annotator or Professional.



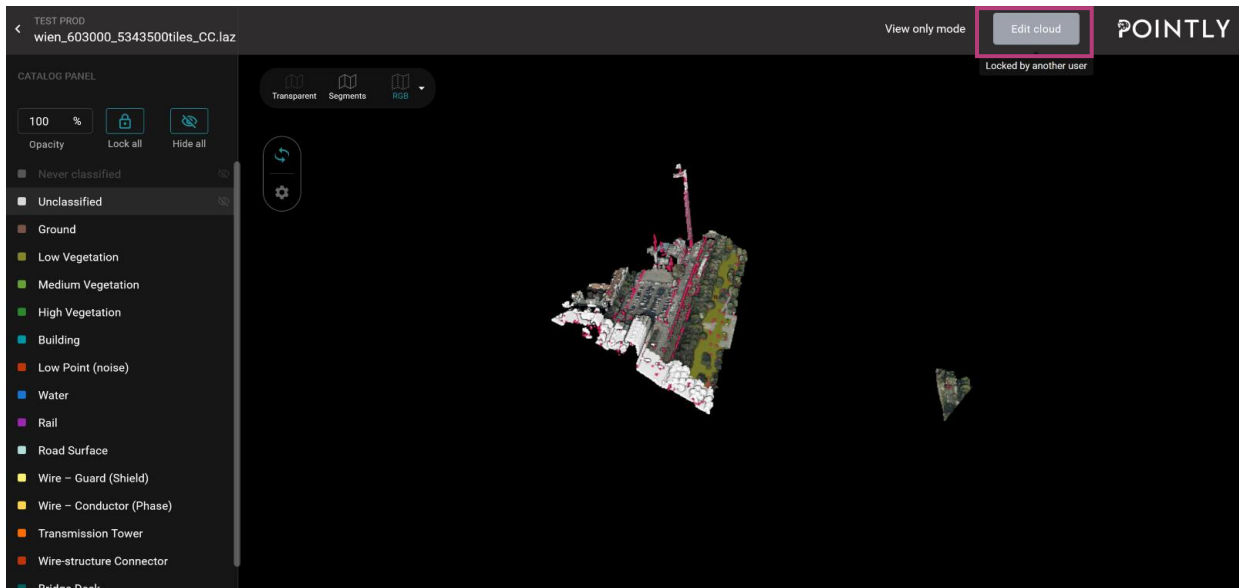
Shared user with appropriate subscription (Annotator Account) can open the projects and see containing point clouds, though such users can't rename or delete items. The class catalog cannot be edited by shared users but only by the project owner.

12.4. Editing Mode

Both Project owner and Annotator can edit any cloud in the shared project. There are no restrictions for using tools while you are in the Viewer. Though, only one user at a time can edit the same cloud. By default, a point cloud is opened in **View-only mode**. To start labeling the file, you need to switch to the editing mode. Just click **Edit cloud** to do that.



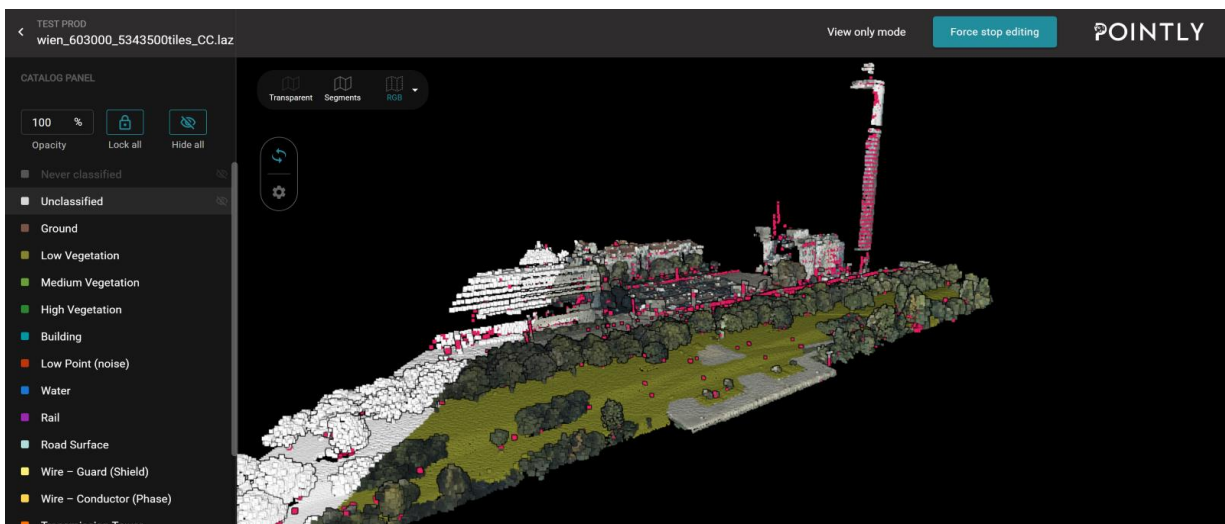
Quick tip: The button is unavailable if someone else is already working with the cloud.



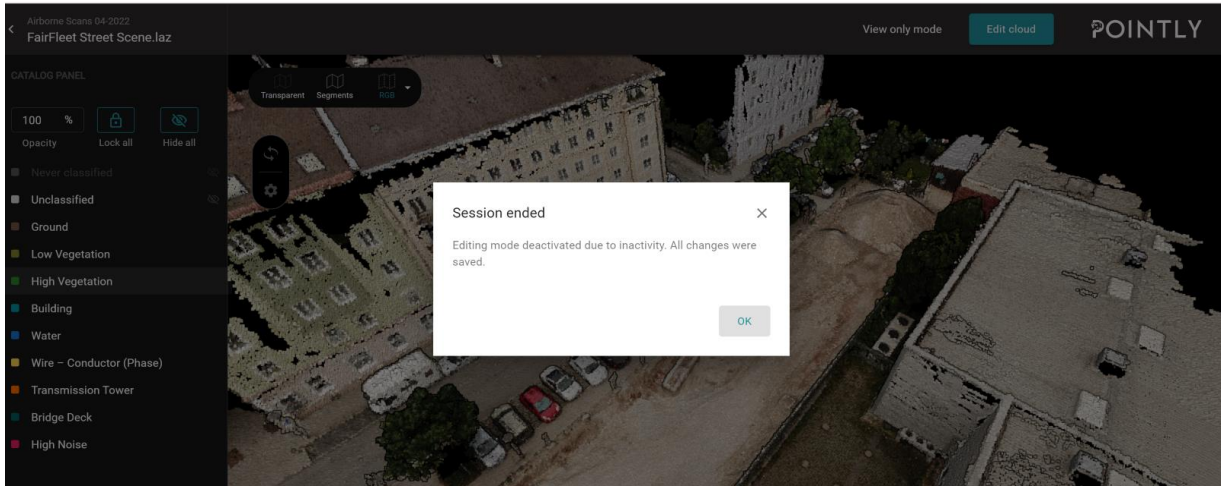
Also, we would highly recommend you click **Finish Editing** every time you're done so that other users could have the ability to edit the cloud as well.

12.5. Force Stop Editing (Project Owner only)

The Project owner is the only user who will be able to interrupt another user's editing session. He can use the **Force stop editing** button for every cloud in his projects while another user is in an active editing session.

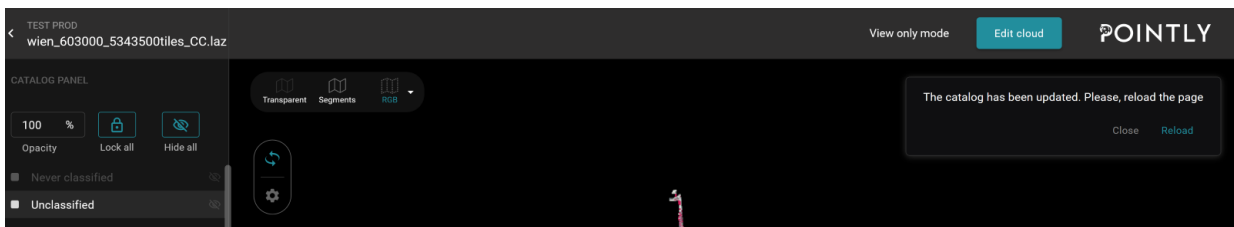


Quick tip: If the user is in editing mode and doesn't perform any new labeling command for 10 minutes, the session will be ended automatically. A notification will be sent that the session was ended and other shared users can begin working on the point cloud.



12.6. Catalog updates

The Project owner is the only one who can access and manage the project catalog. In case a user is actively working on a point cloud and the corresponding catalog is edited by the project owner, a message will pop up in the viewer. Keep in mind that the notification is only sent for the following changes: After reloading the page, the changes will be applied and newly added classes can be selected for classification.



13. Any Open Questions?

For technical support, software assistance or if you have any feedback for us just contact us at support@pointly.ai