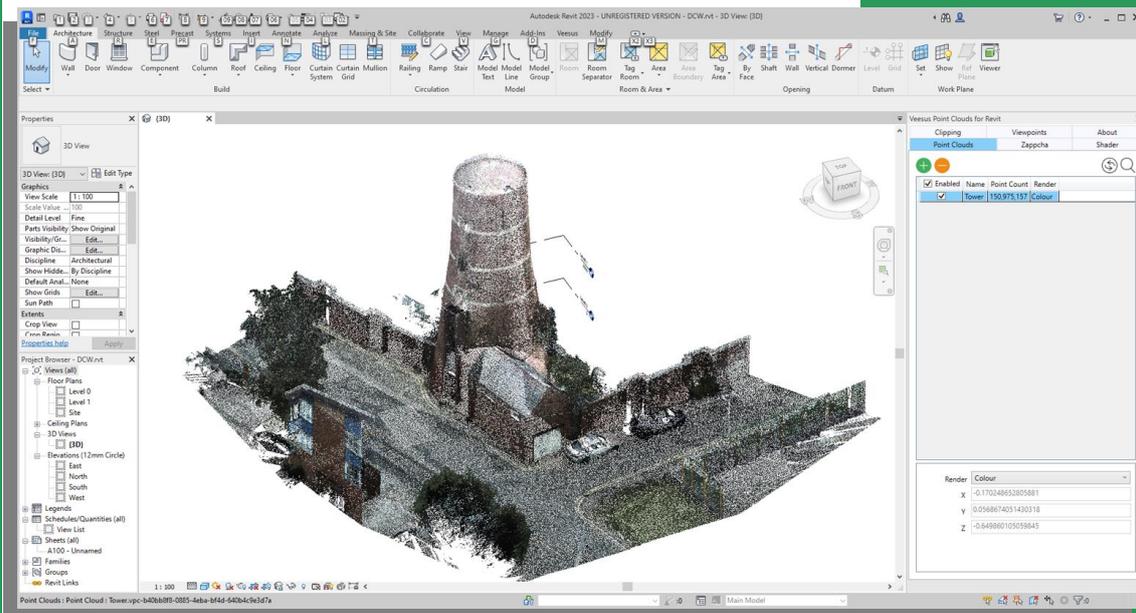


Veesus

Point Clouds for Revit

User Guide



Software Version 2022.0.8059

June 2022

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1 Introduction

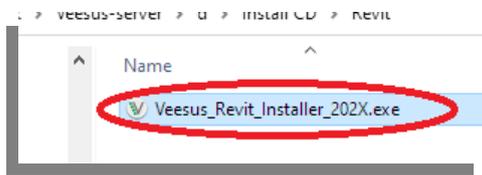
1.1 About

Welcome to the User Guide for Veesus Point Clouds for Revit.

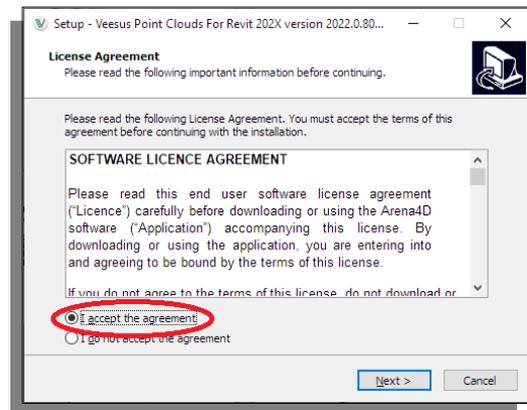
At the core of this add-in is a point rendering engine that allows the rapid loading and visualisation of unlimited point cloud data sets. This engine is used in all Veesus products, including our fully-featured GIS platform, Arena4D.

1.2 Installing Point Clouds for Revit

Point Clouds for Revit installs as an add-in through Revit itself. Once you've downloaded the add-in, run the Setup Wizard and follow all the steps during the installation process.

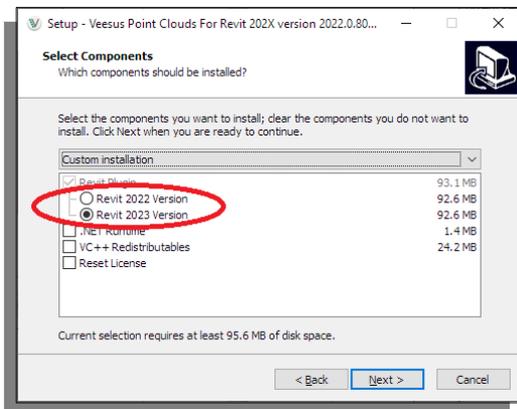


The installer file once downloaded to your machine



Accept the license agreement...

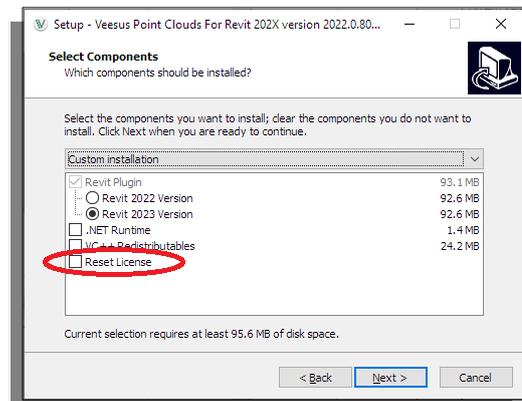
Select the correct version of Revit for your add-in. If you select the wrong one, you won't see it when you try to load it in Revit. If this happens, reinstall the add-in selecting the correct version of Revit.

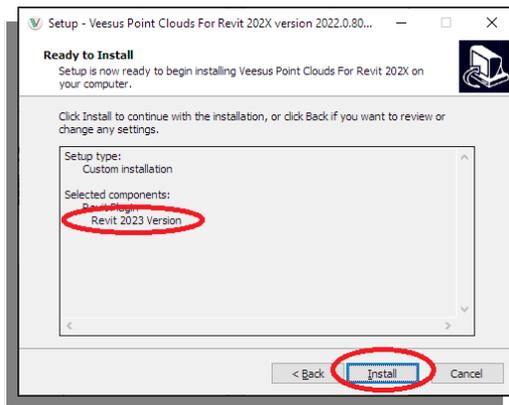


... select your version of Revit to install the plug-in...

If a demo licence has been installed before, select **"Reset Licence"**.

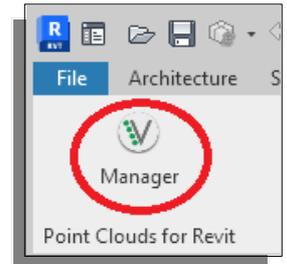
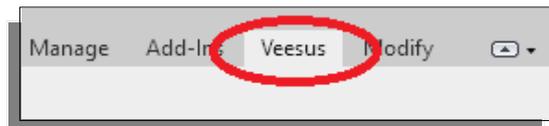
Under no other circumstances select this option. ***If in doubt, contact Veesus support and install without option selected.***





... and click Install!

Once finished, load Revit and you will see a new “Veesus” tab. Select the tab, then select “Manager.”



1.3 Data Formats

Point Clouds for Revit requires point cloud data to be in the Veesus VPC format. To generate a VPC file you need to use the standalone [VPC Creator](#) which can be downloaded for free from the Veesus website.

1.4 Loading & Saving

All Arena4D options are saved into the Revit document. However, the point cloud itself is saved as a reference – meaning that if you move or delete the VPC file after saving the document it will not be loaded the next time you open, and you’ll receive an on-screen notification.

1.5 Centre Pivot Point Control

When manipulating around a point cloud (especially a large point cloud) it is useful to centre the “pivot point.” This gives you accurate rotation of the camera in a perspective view. To centre the pivot point, use the “Navigation Wheel” and “Centre” as you would normally when using Revit.

2 General Workflow

Once point cloud(s) are loaded into Revit via the add-in, you’ll want to work with them. Below, we’ve suggested a workflow you could use to get the best from your point clouds:

- Load Point Cloud(s) and adjust Render and X,Y,Z coordinates if required
- Perform a shader for a quick inspection of elevation changes (see Section: 9)
- Perform Clipping (see Section: 6)

3 User Interface

3.1 General

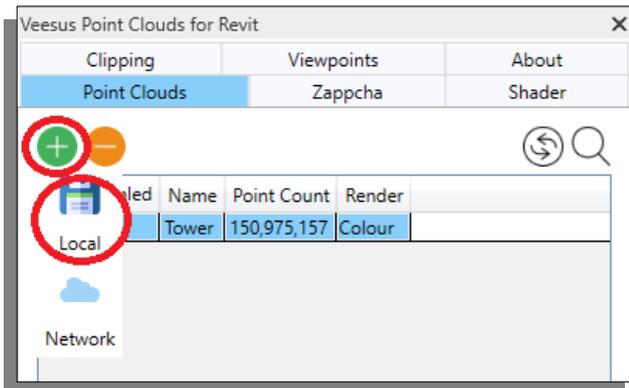
The Point Clouds for Revit user interface is very simple. You'll see a number of tabs which separate the key controls of the add-in into logical sections.

In many sections you will see two common buttons. The "+" button adds an item to the current list, the "-" button removes items from the current list.



The add and remove icons. You'll see them a lot around the plug-in

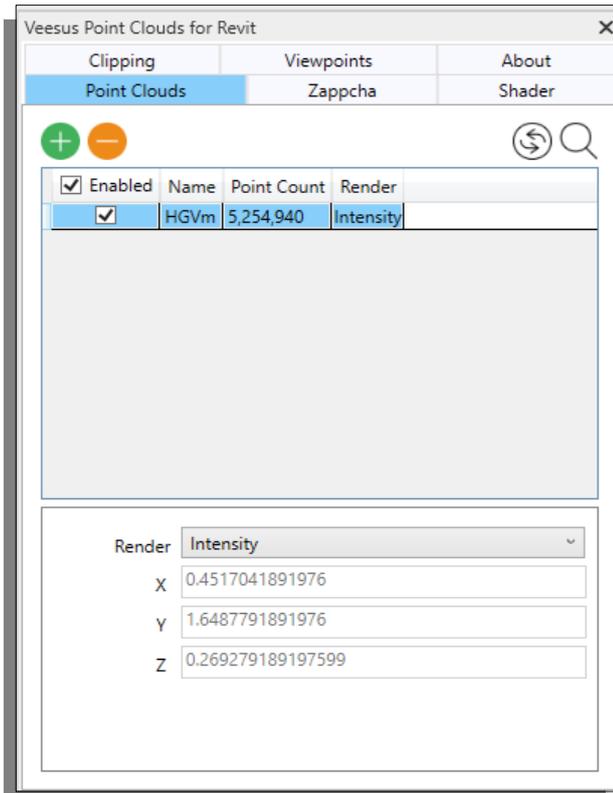
3.2 Point Clouds



To add a point cloud to your document, press the + button. You have the option to add a point cloud from your local machine, or a network location. Clicking the **Local** option allows you to browse your computer to find your point cloud. For more information on loading point clouds from network locations, see sections 4 and 5.

*When you click the + icon to load a point cloud, you'll see these two options. Click **Local** to load a point cloud from your machine*

When a point cloud is added and selected in the displayed list, a number of options become available which control the appearance of that point cloud. **Note that you must select the point cloud in order for those options to work:**



Zoom – this button centres the Revit view on the currently selected point cloud(s).

Restore – this button restores any points that you've deleted from the point cloud.

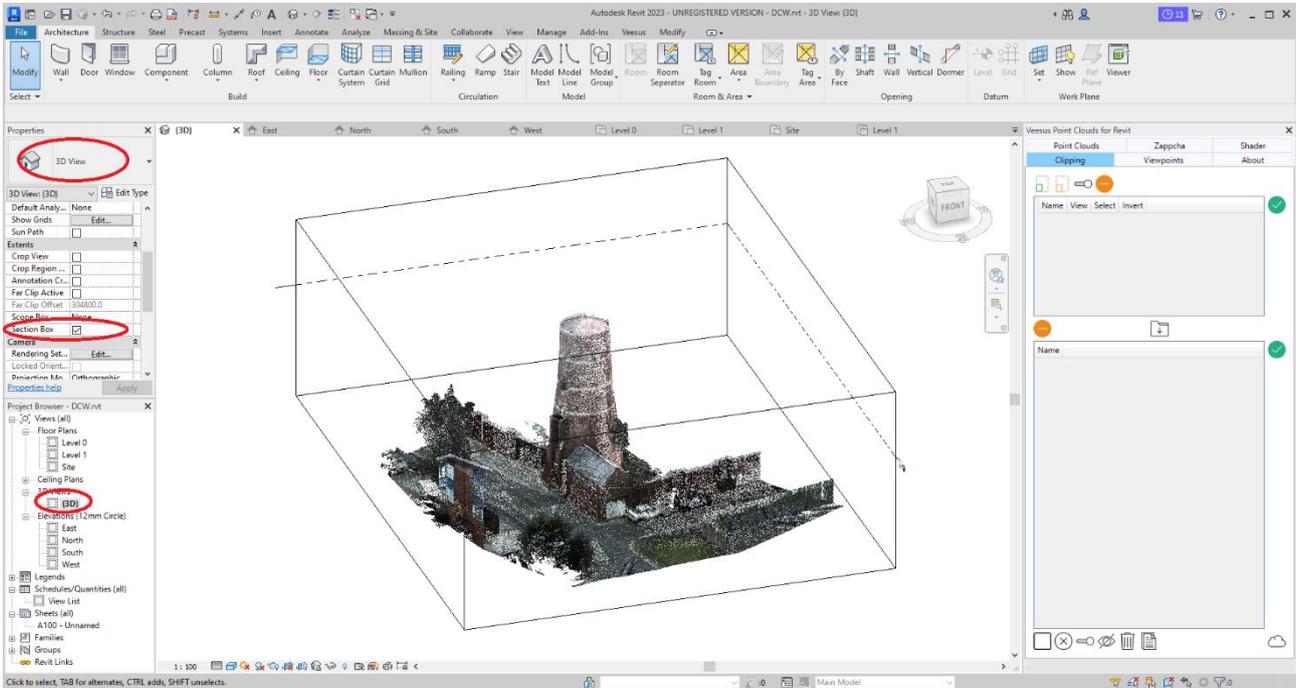
Render – enables you to draw using Intensity, Colour and Ramp values for chosen point cloud(s).

X, Y, Z – the position of the selected point cloud(s) in Revit.

The Point Clouds tab in Point Clouds for Revit

3.3 Clipping

The Clipping tab is used to select areas of point cloud data (called clips) that you wish to hide or unhide. To start creating clips you will first need to turn on the Section Box in Revit; to do this, click the 3D checkbox in the project browser view; this will call up the 3D View properties tab, from which you can select the Section Box tickbox.



The Section Box in Revit. On the left circled in red you can see the checkboxes needed to activate the Section Box, and the 3D View tab which appears when you check the 3D checkbox. The black lines around the point cloud are the section box.

Once the Section Box is on, use the Clipping tab to create your clips. The four main controls in the Clipping tab are:

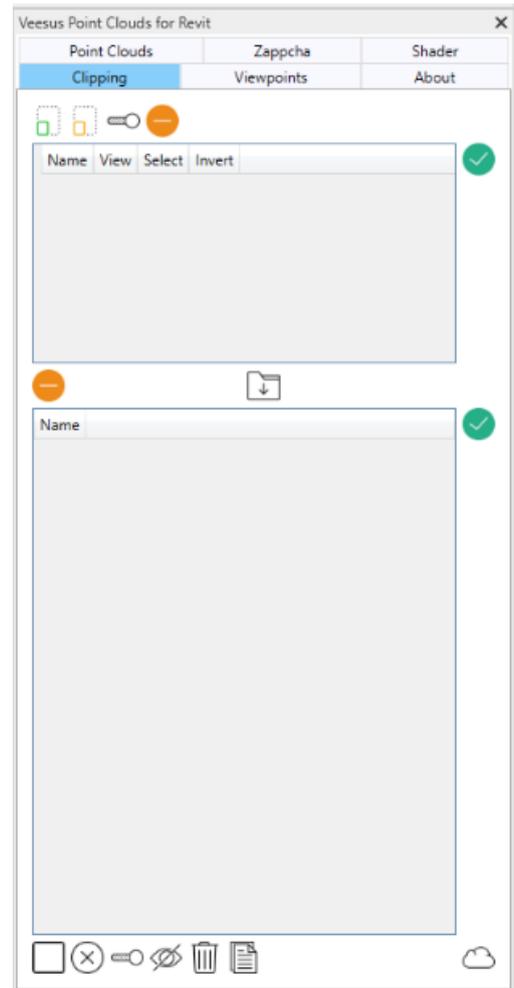
-  **Select** takes all the data within the Section Box and creates the clip. Once selected the points in the clip will turn green.
-  **Unselect** works in the same way, but unselects everything within the Section Box.
-  **Invert** toggles the effect of the select and unselect tool. Instead of selecting all inside the Section Box they will select everything outside of it.
-  **Remove** removes selected clip(s).

At the bottom left of the clipping panel are seven buttons:

-  **Select All** selects all the points in the currently enabled point cloud(s).
-  **Clear** unselects all the points in the currently enabled point cloud(s).
-  **Invert** inverts the current selection.
-  **Hide** will make selected points become invisible/visible.
-  **Delete** removes the points in your clip from the point cloud.

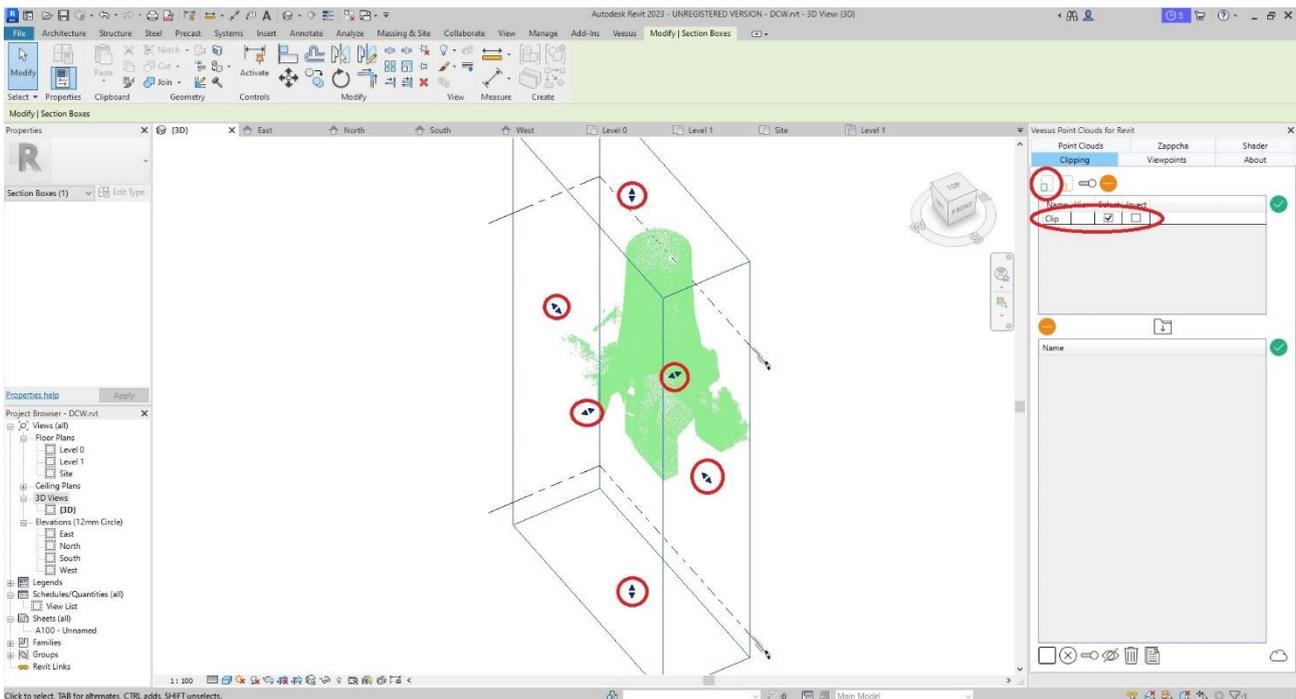
Note: to restore the point cloud back to how it was originally created with the VPC Creator see section 3.2 Point Clouds "Restore".

-  **Copy** selected points in your clip to a new Veesus Point Cloud (VPC) file. The add-in will ask you to set a file name for the new point cloud.
-  **Generate Point Cloud** takes the points in your clip and creates a new point cloud file. You can choose the format (e57, las, pts, RECap), and will be asked to create a name for the new file.



The Clipping tab

To create a clip, resize the selection box to include the data you want to clip; once you have the clip sized correctly, click the **Select** button to create the clip.



Here you can see a clip taken from the point cloud data. The arrows circled in red can be clicked and dragged to resize the Section Box to include the data you want to clip. The Select button and the clip itself in the Clipping tab have also been circled. Note how the points have turned green to show they are included in the clip.

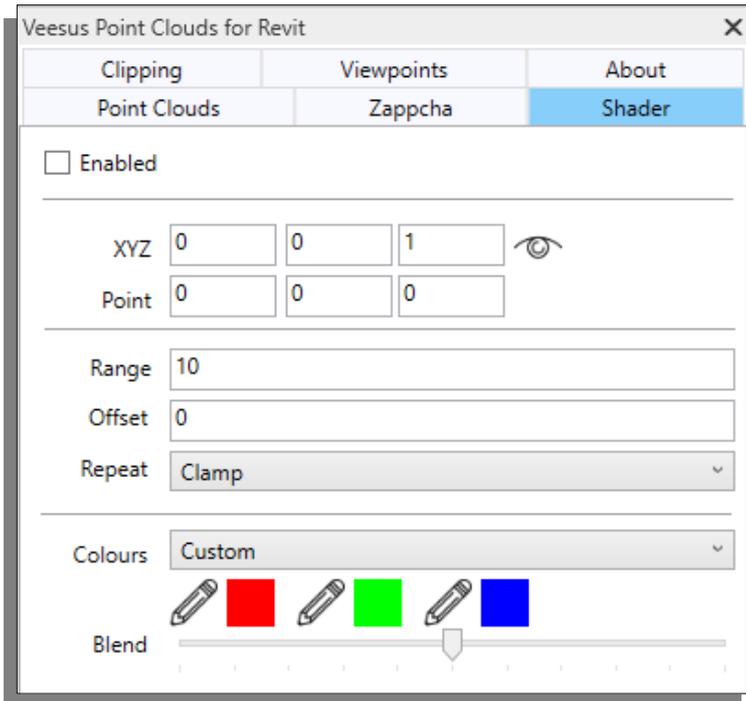
As well as creating individual clips you can group a series of clips into a clip group. For example, you may have created a number of clips to isolate a chair in a room. You can select all these clips and create one single clip group by pressing the **create clip group** button in the Clipping tab. 

Individual clips or clip groups can be applied at any time by either double clicking them in the list or clicking the **process** button opposite the table. 

Delete Selected deletes all individually selected clip(s) and in the group section deletes all individually clip group(s). 

Note: This option does **NOT** unselect all the points in the currently enabled point clouds. For this to happen select the **Clear** button.

3.4 Shader



The Shader tab

The Shader tab controls the planar shader. The planar shader colours data along a plane or vector from a given position or offset, and is a great way of seeing differences in topology in your data that you might otherwise miss.

Once the shader has been enabled you can change its direction by changing the **X, Y, Z** values in the Shader tab. If your point cloud is aligned to the planes, the X, Y and Z values should add up to 1, with the value 1 being placed in the plane direction you wish to shade. If your point cloud is not true to the planes then you will need to offset the values to align the shader (for instance, you may have X = 0.054, Y=-0.041, and Z=0.998.)

A simpler option is to align the shader to the view direction. Pressing the eye icon  will set the X,Y,Z values for you and set the shader “**zero**” point to be your current view position.

The rest of the options in the Shader tab are as follows:

Range – sets the distance over which the shader will calculate values.

Offset – determines the distance from the shader zero point to start calculating from. Useful for moving the shader along the axis.

Repeat – how the shader should act once it has gone beyond either the start or end location as calculated by Range + Offset. The options in the dropdown include:

- *Clamp: continue with first/last colour.*
- *Stop: don't apply colours beyond range.*
- *Repeat: loop through colours again.*

Colours – lets you choose between your own custom colour palette in the shader, or to use the entire RGB hue values.

Blend – changes how much the true colour of the point cloud shows through the shader.

3.5 *Point Cloud not displayed correctly*

There are conditions that may stop a point cloud being displayed:

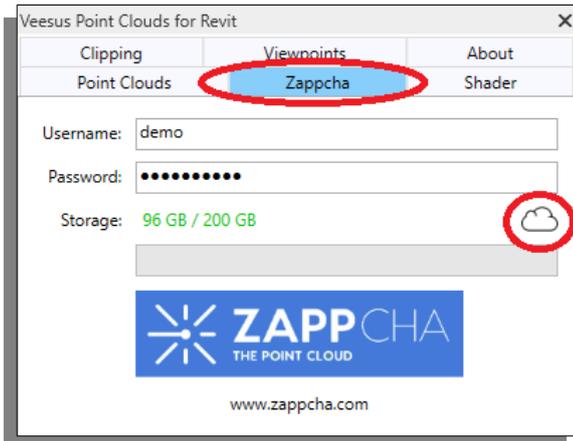
- Some VPC files are “protected.” Protecting a file disables export functions and enables users to add an expiry date to the data. Once the expiry date has passed you will no longer be able to view the data.
- The point cloud file(s) may have been moved from its original directory location. If this is the case the point cloud will have to be re-loaded from its new location, or moved back to its original location.

If your point cloud data is not visible, check with the VPC provider whether they protected and enforced an expiry data on the files you were provided.

4 Zappcha

Users with access to Zappcha can stream point cloud data stored in the Zappcha Cloud to Point Clouds for Revit. This means you can work on point clouds without having the data on your computer. 

Note: you need an active Zappcha account to use this feature. To create your Zappcha account for free, please visit Zappcha.com.



To access Zappcha, first select the Zappcha tab.

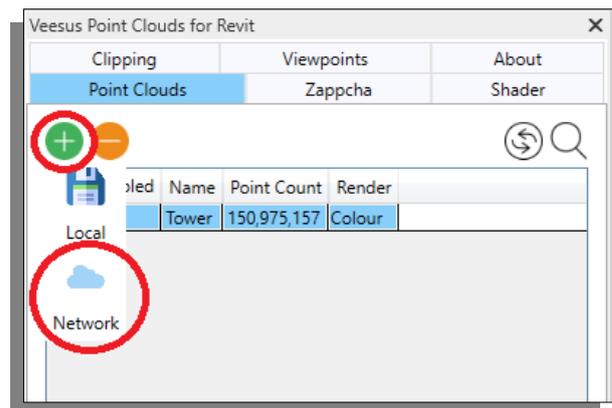
Enter your **username** and **Password**.

Click the **Cloud** button to log in to the Zappcha Cloud.

The Zappcha tab in Point Clouds for Revit. Click the cloud icon to log in.

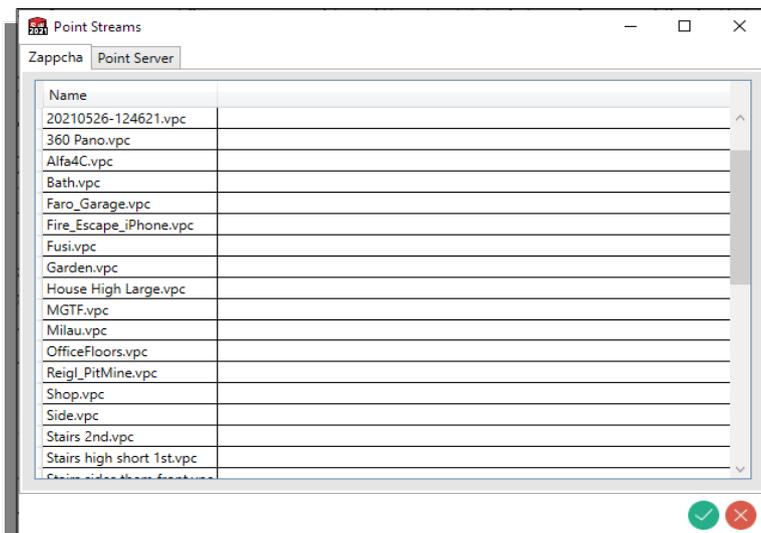
To access your point clouds saved to the Zappcha Cloud, select the Point Clouds tab.

Click **+** and select the **Network** button to launch the **Point Streams** window.



In the Point Streams window, select the **Zappcha** tab.

Click on a point cloud in the list to select it, and simply click **Open** to start streaming that point cloud to your viewer. Once it has loaded, the point cloud can be worked on in exactly the same way as any other point cloud, except for the deletion of points. The red cross button next to it closes the window.

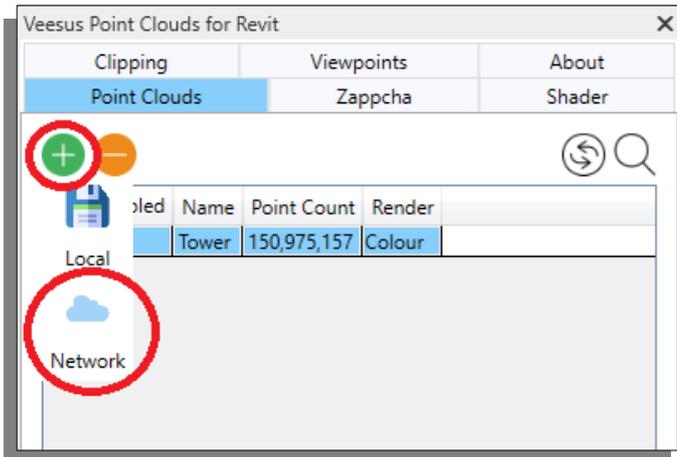


The Zappcha tab in the Point Streams window. The green tick opens the selected point cloud; the red cross closes the window.

5 Arena4D Point Cloud Server

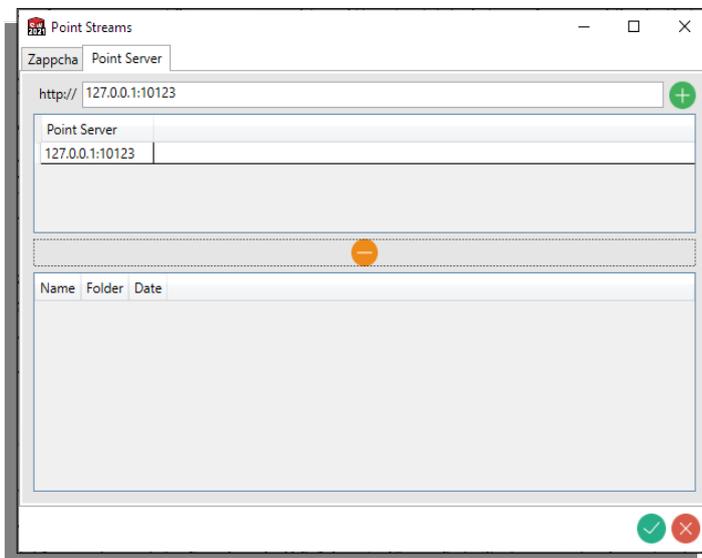
For users who own or have access to Arena4D Point Cloud Server(s) you can stream point clouds to Point Clouds for Revit.

To access Point Cloud Server, first select the Point Cloud tab.



Select the **Network** button to launch the **Point Streams** window.

In the Point Streams window, select **Point Server** tab. This will bring up a list of all the servers you have saved in the add-in (and so will be empty the first time you open it!)



To add a new server, enter the URL of the server **including the port number**, then click the

Add button. 

In the screenshot you can see our example, *127.0.0.1:10123*, where the port number is *10123*.

Once the server is added it will appear in the list of available servers. To select a server from the list, simply click on it.

Selecting a server will produce a list of all the point clouds on that server.

Once a point cloud is selected from the server simply click **Open**  to start streaming that data to your viewer.

Streamed point clouds can be manipulated in anyway a normal point cloud file can be, except for deletion of points. The red cross button next to it closes the window.