



Working Efficiently with ReCap Pro on Reality Captured Projects

Yan Fu

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About the speaker

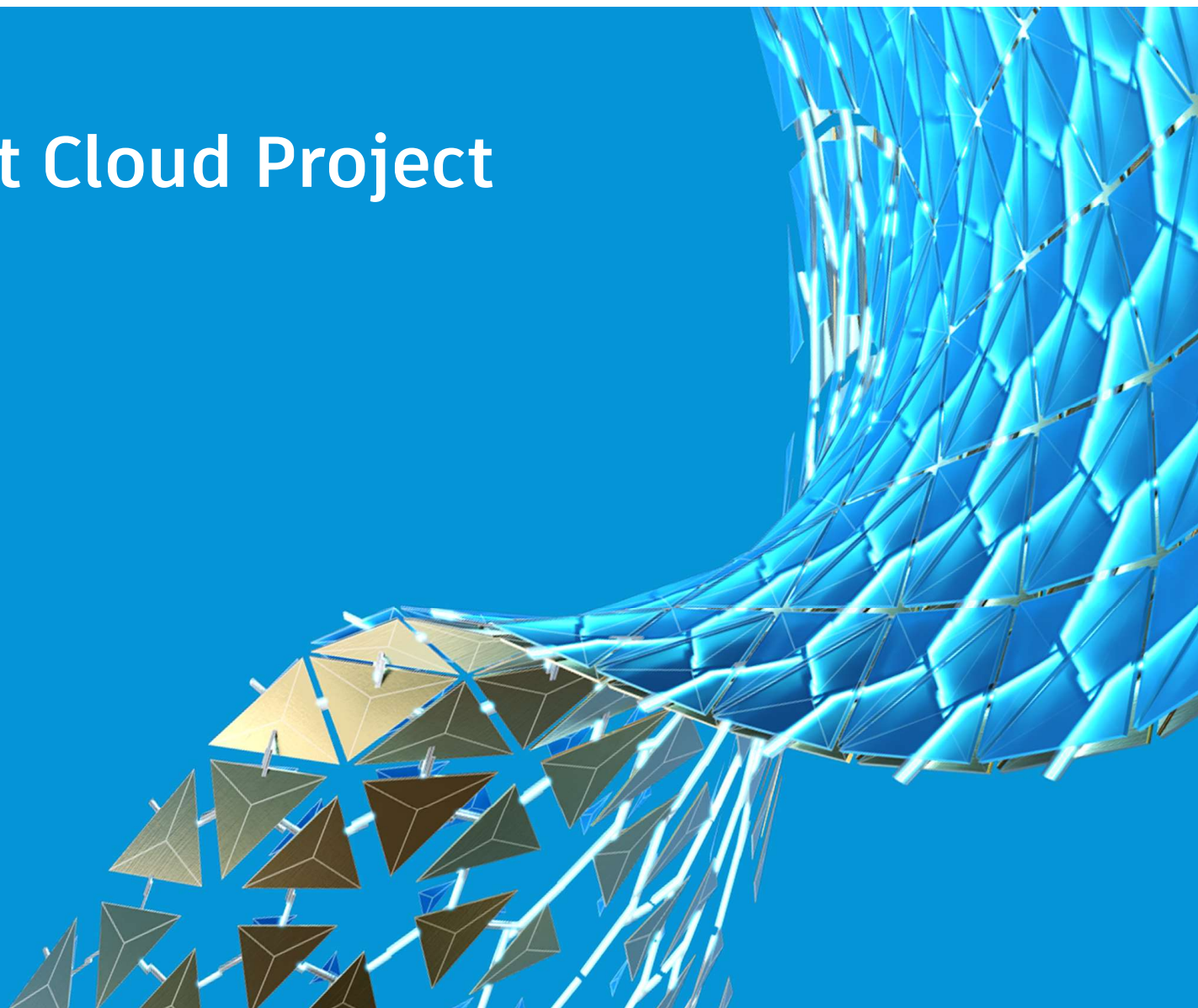
Yan Fu

Yan Fu is a sr. principal research engineer in Autodesk Reality Solutions Group. Yan has over 10 years experience in software research and development of the reality capture industry.

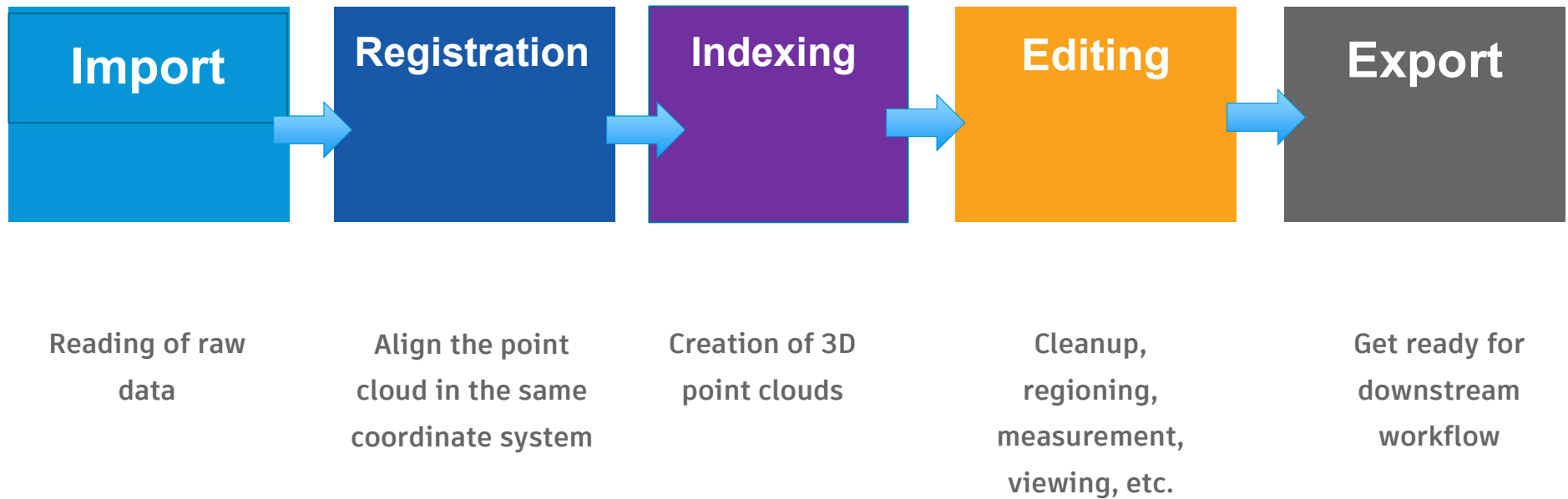
Key Learning Objectives

- HOW TO PREPARE POINT CLOUD PROJECT IN RECAP
- HOW TO MAKE POINT CLOUD EDITING FASTER FOR LARGE PROJECT
- HOW TO MANAGE YOUR RECAP PROJECT FOR COLLABORATION
- DISCOVER CUSTOM AND AUTOMATION WORKFLOW OF RECAP

Prepare Point Cloud Project in ReCap



ReCap Workflow



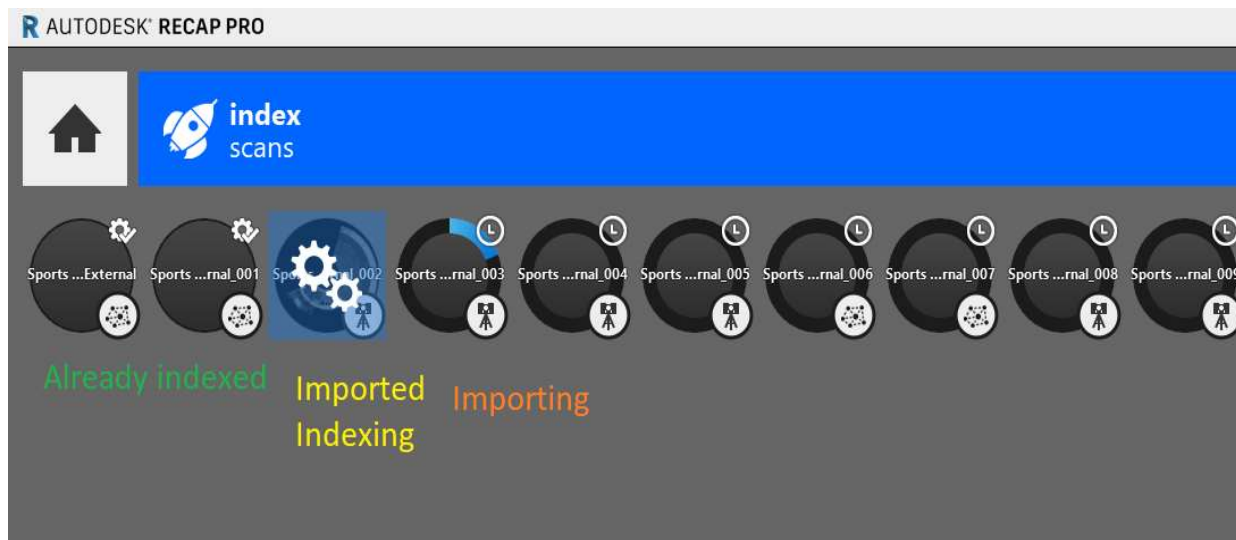
Import / Indexing Raw Scans

IMPORTING

parse the raw scans and convert the raw scan into .rcc files or intermediate files

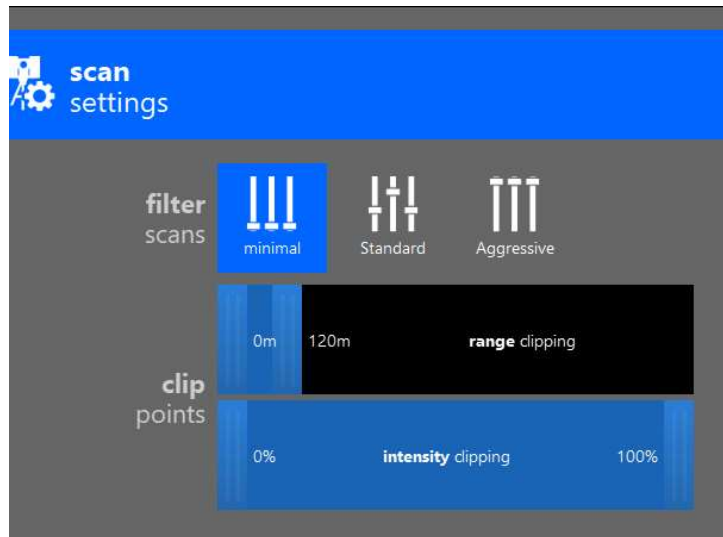
INDEXING

compute the derived information and creating the indexing structure for the point cloud

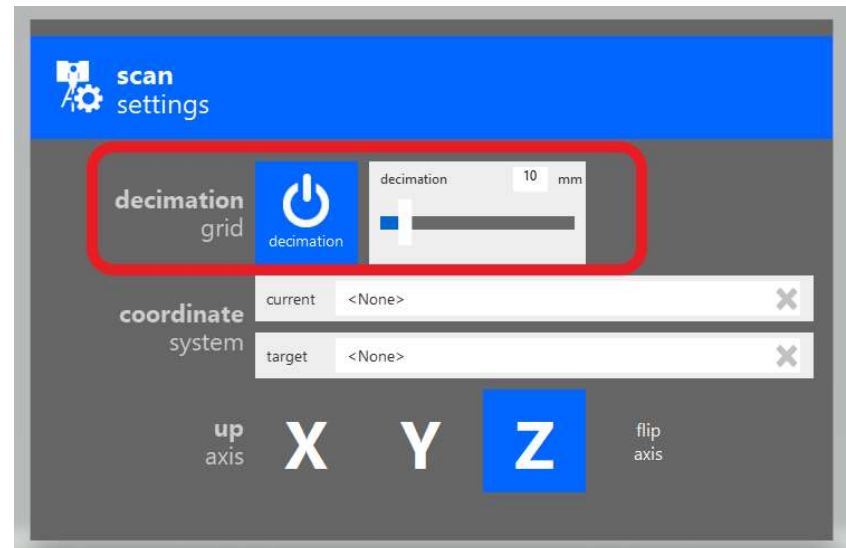


Point Cloud Filtering and Decimation

NOISE FILTERING

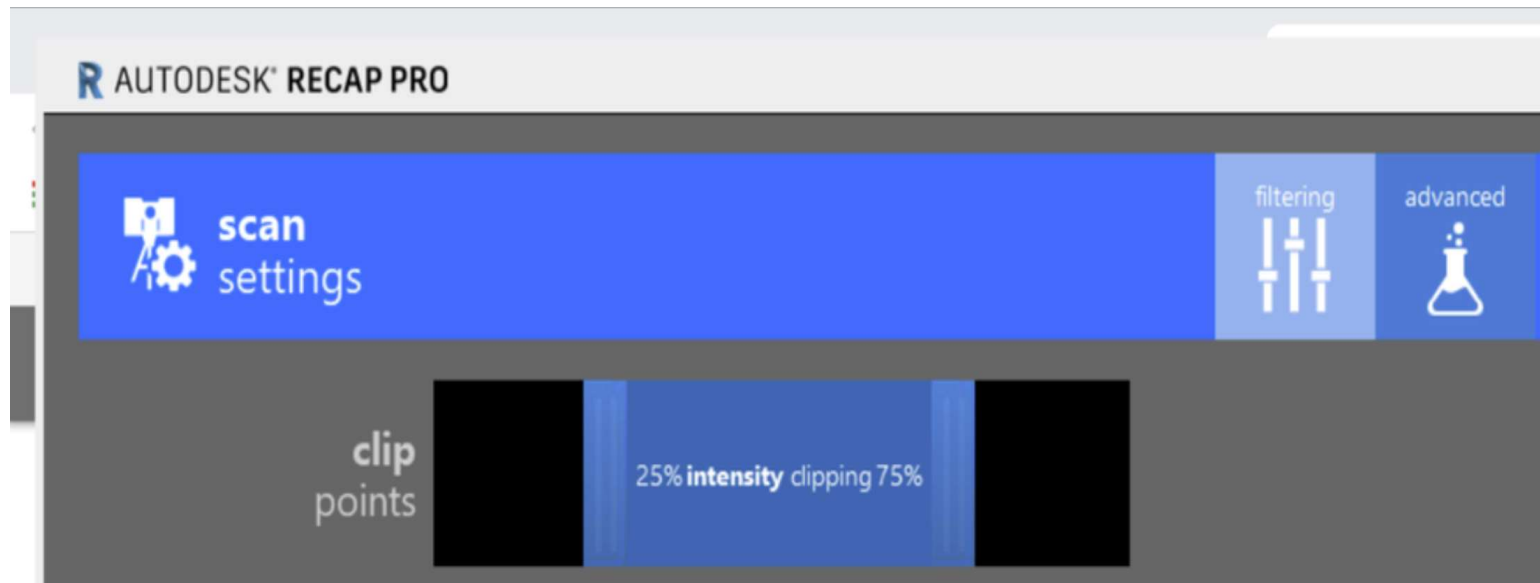


DECIMATION GRID

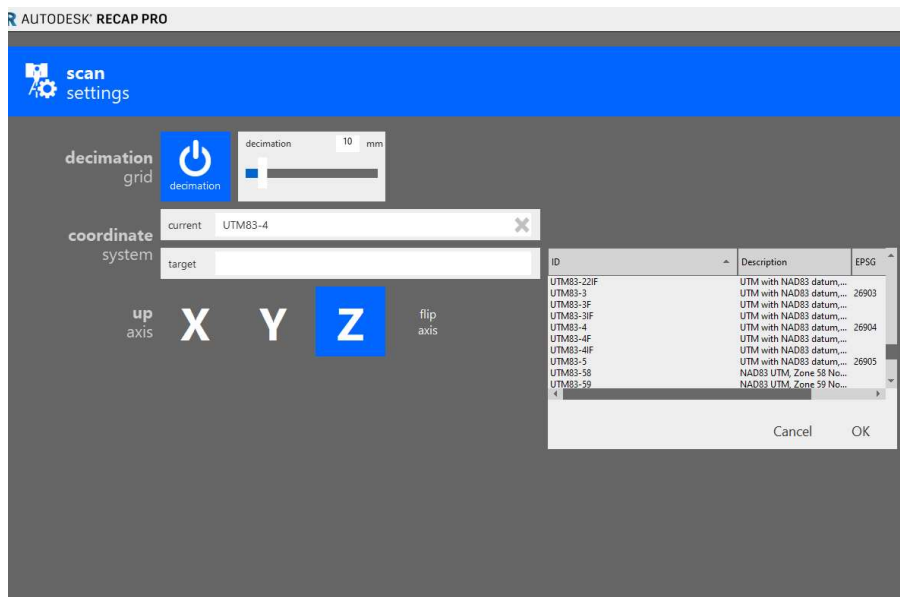


Point Cloud Filtering

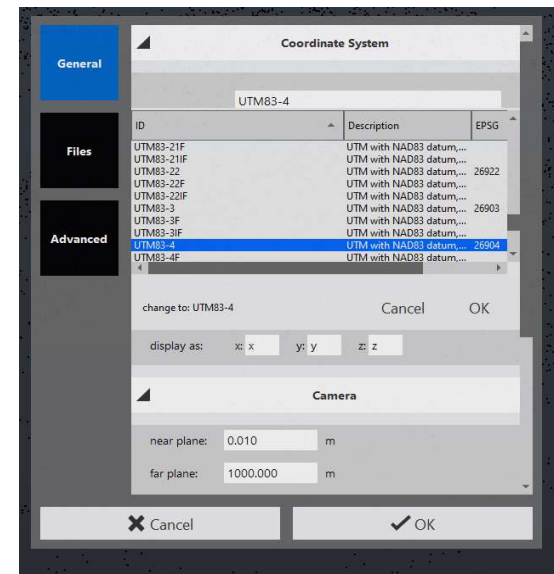
FILTER OUT POINTS WITH EITHER TOO LOW OR TOO STRONG INTENSITY



Coordinate System Setting



Coordinate system information is carried with
RCS file



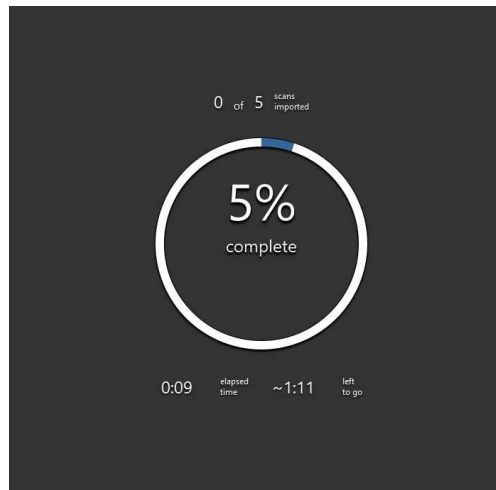
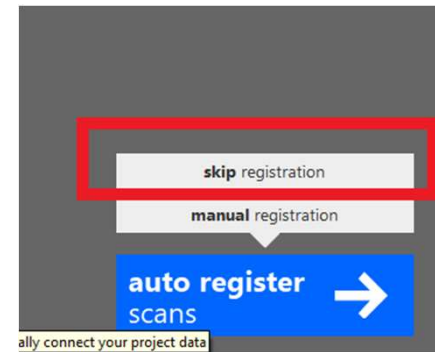
Coordinate system information is saved in RCP file

Unit Setting

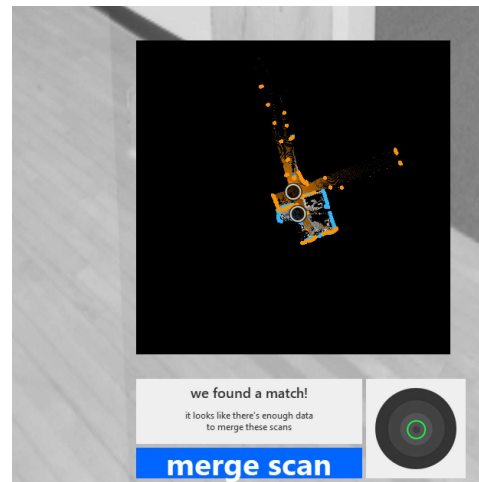
- **Metrics Unit**
 - Input data is converted into metric unit in ReCap
- **Raw scans**
 - LiDAR data
 - Can specify source (current) coordinate system to be imperial units
 - Ascii file
 - Can specify unit in file format setting
- **Project Unit Setting**
 - For display only

Registration

- **Optional**
 - Skip registration if your scans have been registered
- **Smart match**



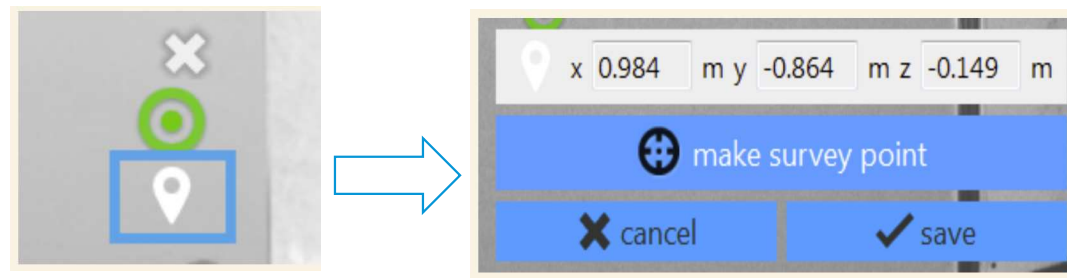
Auto-suggestion



Auto-registration

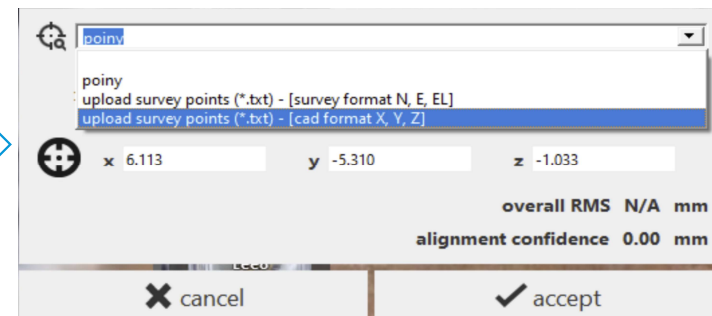
Registration

- **Importing survey points**
 - If you want to integrate your GPS data, you can use them as survey point in the registration process.

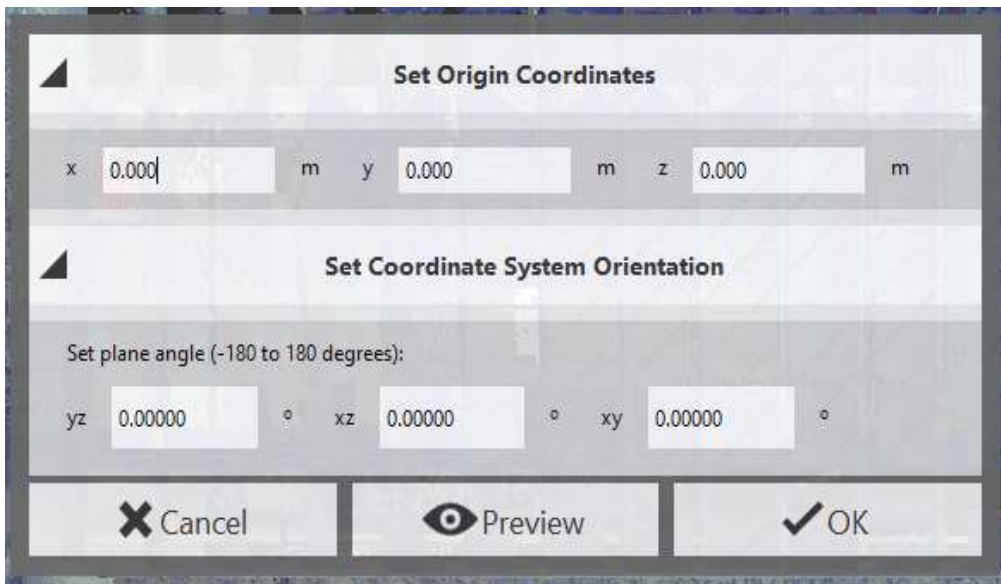


Sample survey point .txt file format:
IMPORTANT: Need to use TAB as delimiter

```
8918 -56.598243 -107.318579 62.221082
8921 -52.8204 -110.215829 62.244613
8927 -42.684408 -110.215055 62.297404
8931 -37.009784 -110.211224 62.226203
```



Update Origin



A dialog box titled "Set Origin Coordinates" with two sections. The first section, "Set Origin Coordinates", has input fields for x (0.000), y (0.000), and z (0.000), each followed by a unit "m". The second section, "Set Coordinate System Orientation", has a label "Set plane angle (-180 to 180 degrees):" and three input fields for yz (0.00000), xz (0.00000), and xy (0.00000), each followed by a degree symbol. At the bottom are three buttons: "Cancel" with a red X icon, "Preview" with an eye icon, and "OK" with a checkmark icon.

Set Origin Coordinates

x 0.000 m y 0.000 m z 0.000 m

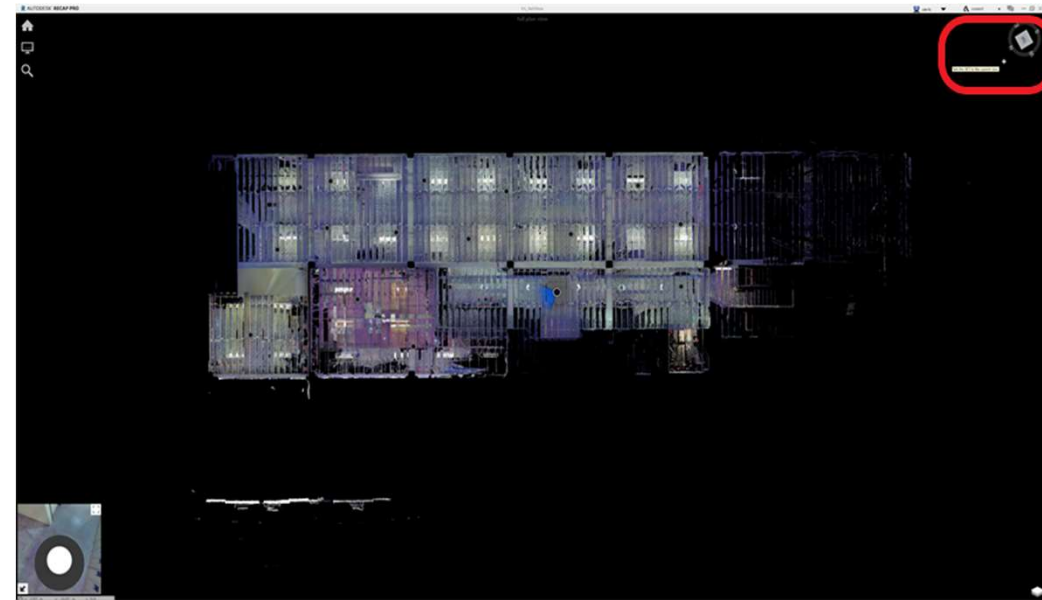
Set Coordinate System Orientation

Set plane angle (-180 to 180 degrees):

yz 0.00000 ° xz 0.00000 ° xy 0.00000 °

Cancel Preview OK

Manual Input

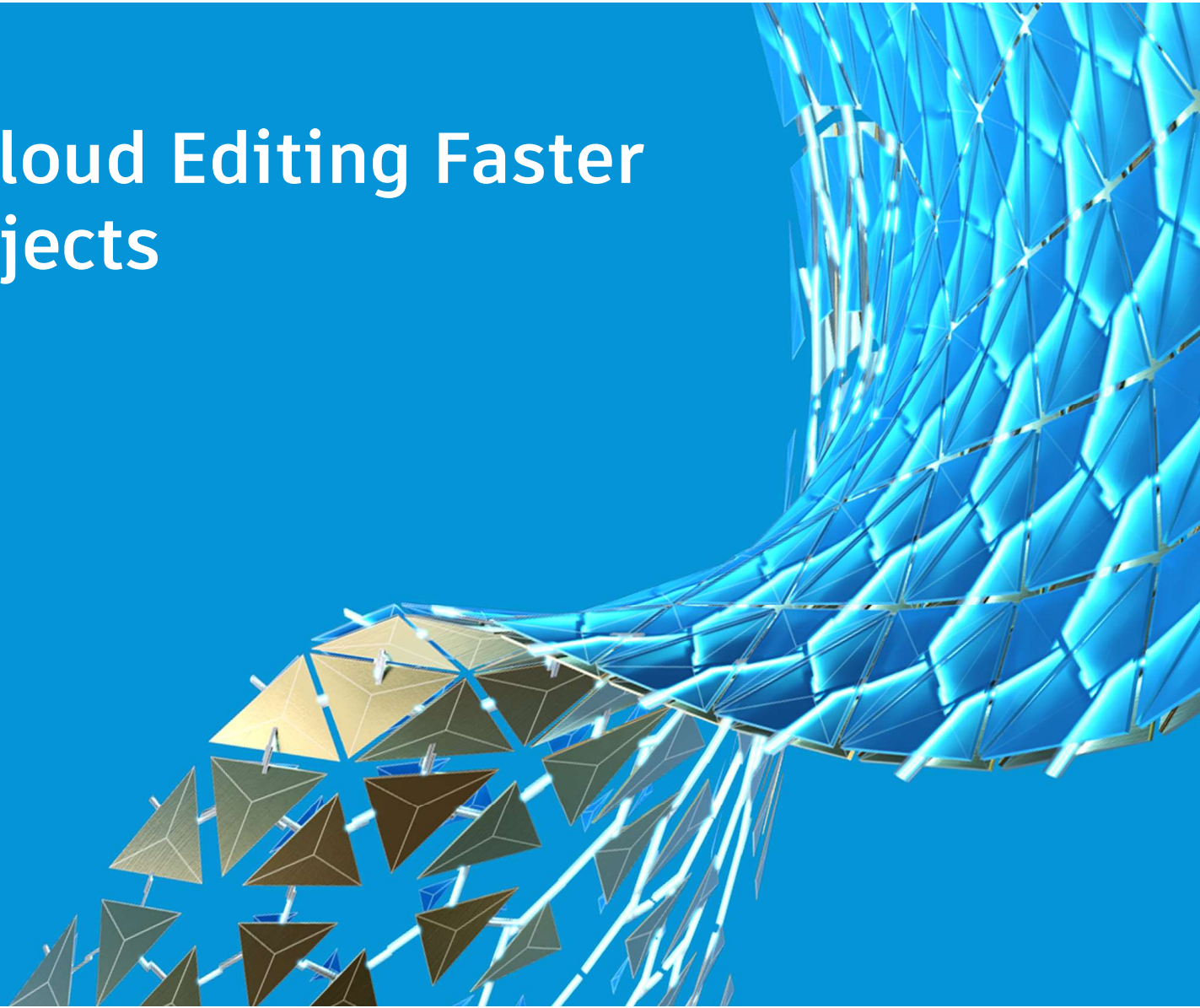


View Cube Widget

Export Project

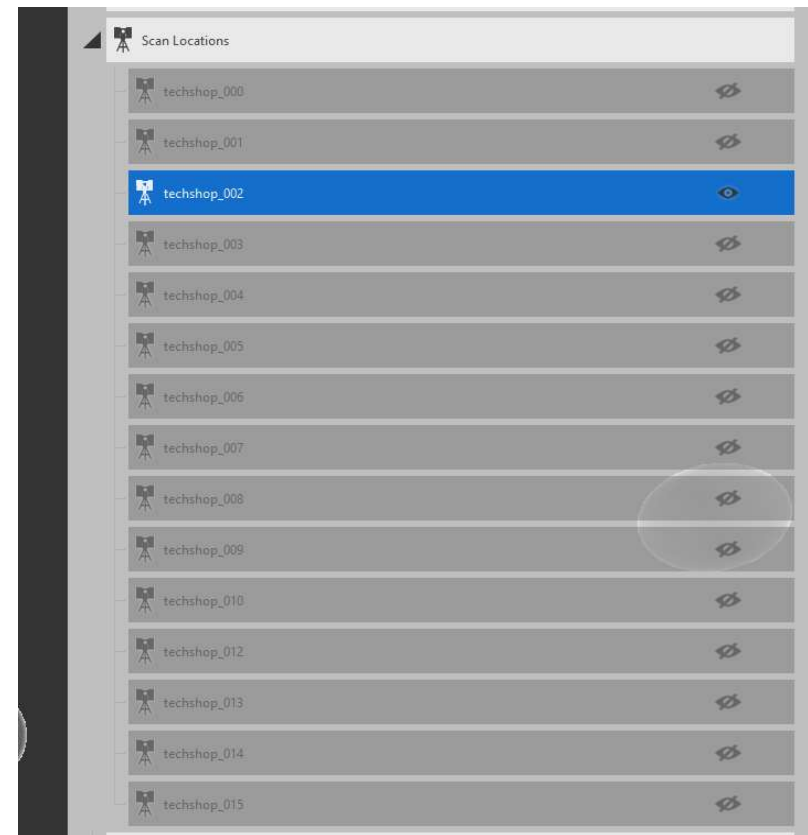
- **Unified RCS / RCP**
 - Remove deleted points
 - Remove redundant points
- **E57 Files**
 - Structured e57: all the structured information will be kept but it will ignore all the editing information.
 - 3D e57: it will respect the editing information and only the visible points will be exported.
- **Pts File**

Make Point Cloud Editing Faster for Large Projects



Scan Visibility Control

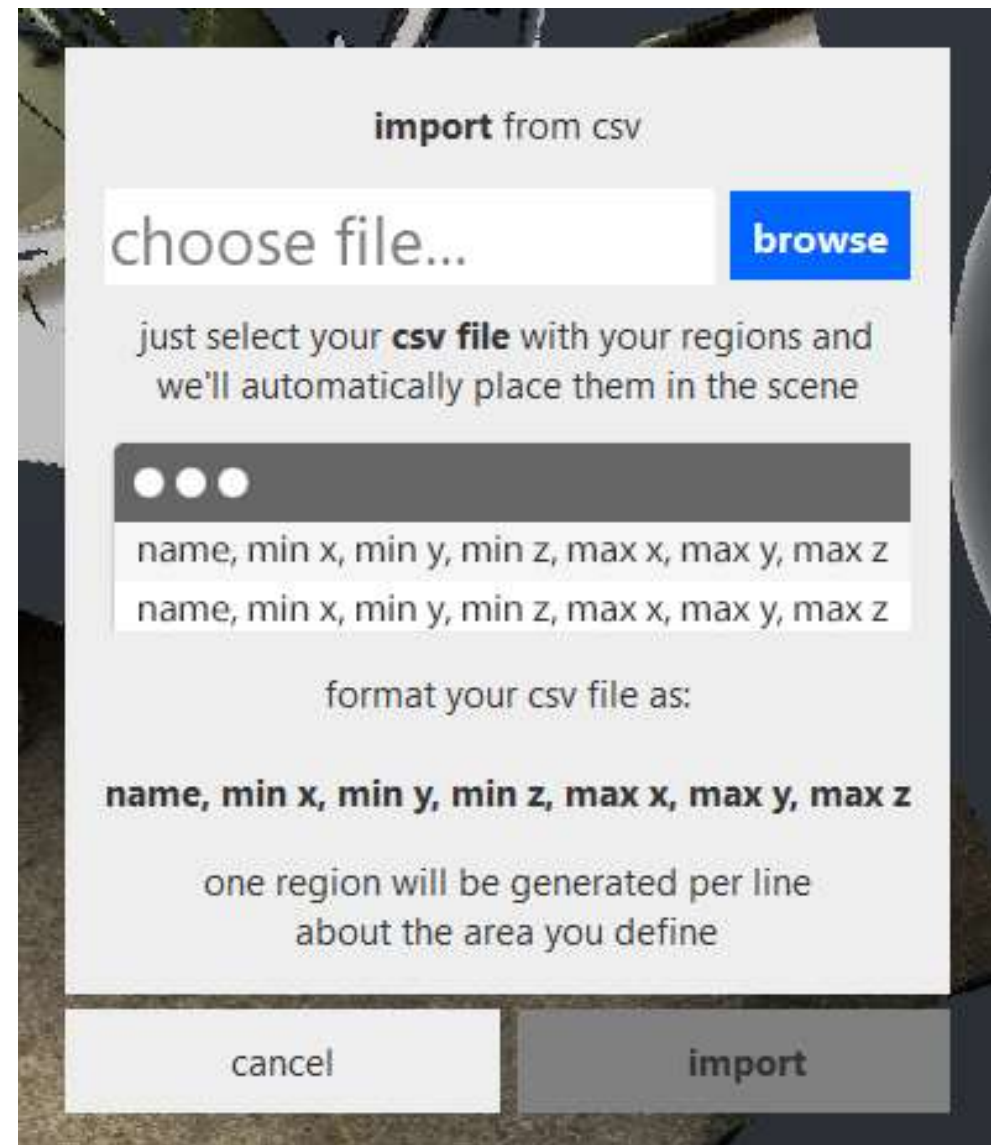
- Multi-Selection with CTRL / SHIFT key
- Isolate scans with ALT + click

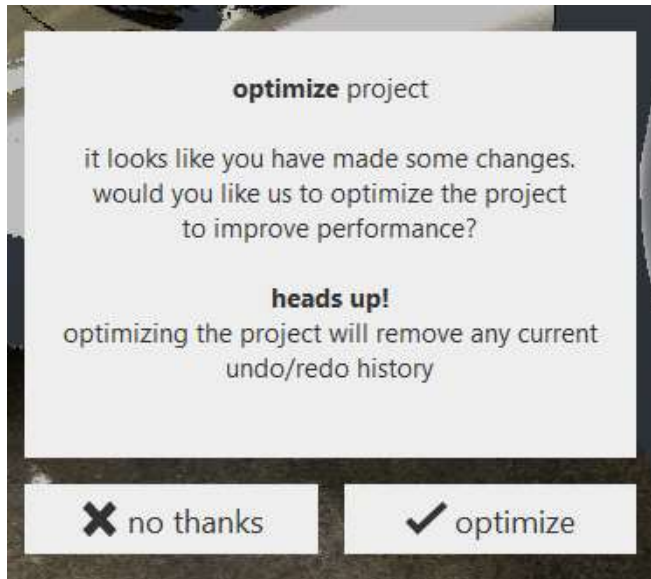


Import Region From CSV file

New regions will be generated for each line provided in the CSV file and will automatically populate the project.

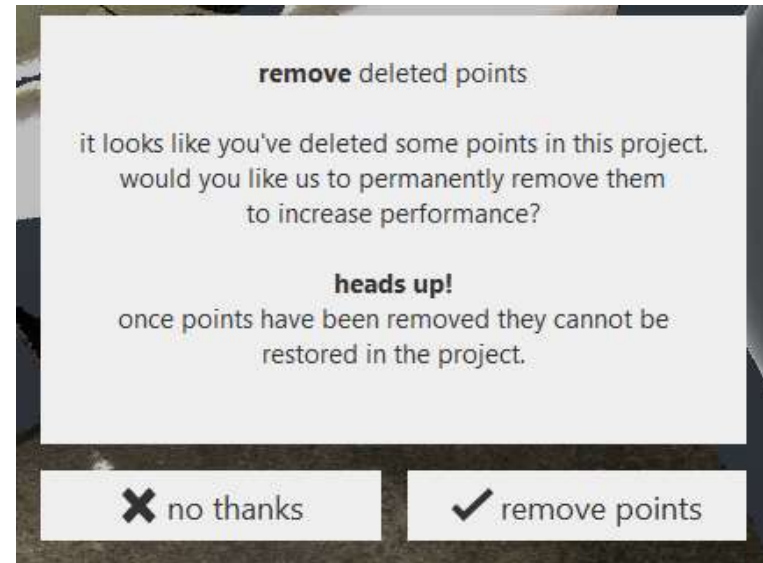
- Precisely create region per request
- Avoid small and multiple editing





Optimize Project

- Editing history is cleared
- Deletion flag is persistent into .rcs file
- No file size change on .rcs file
- Deleted points can be recovered
















Remove Deleted Points

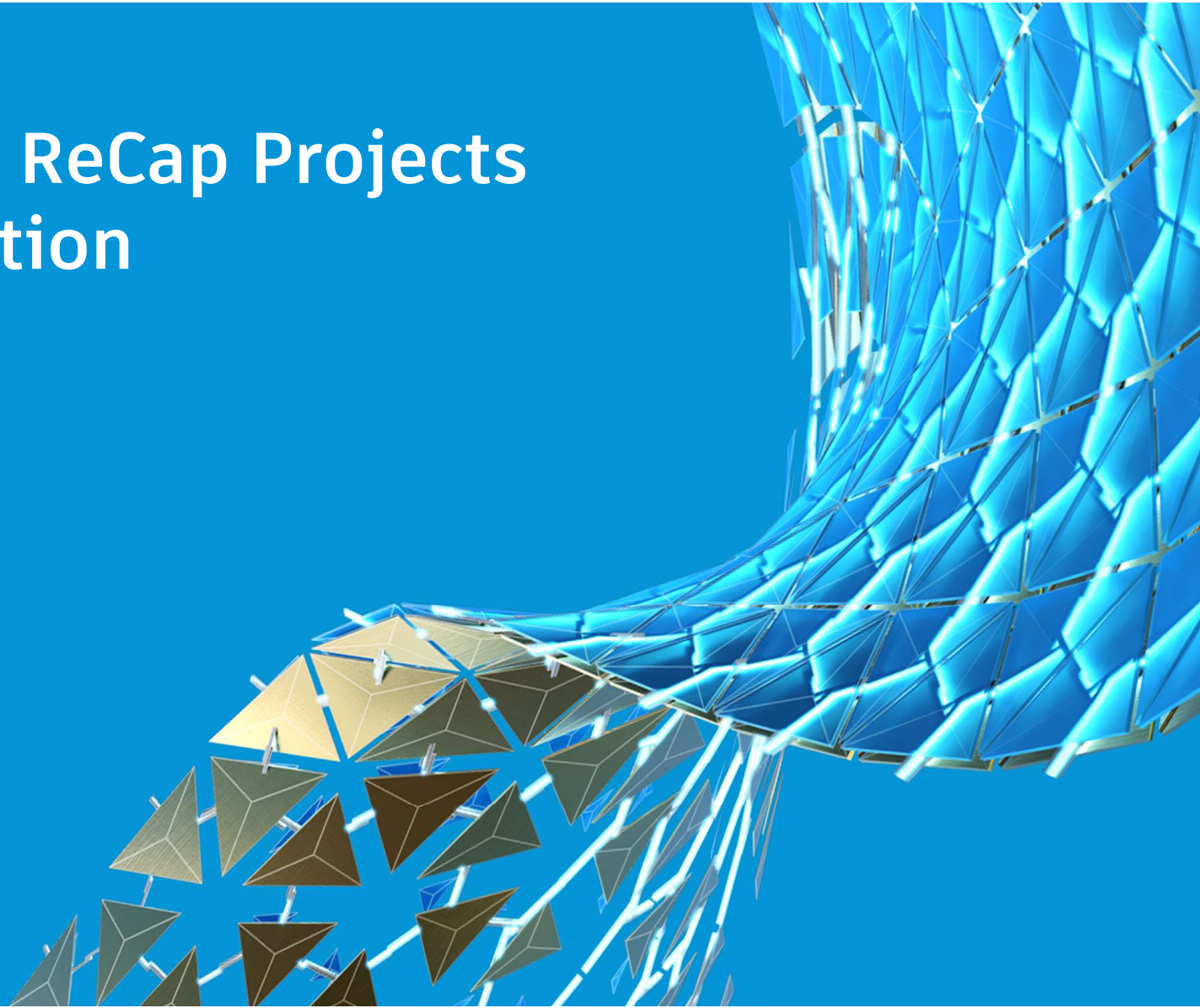
- Editing history is cleared
- Deleted points are removed from .rcs file
- RCS file size is reduced
- Deleted points cannot be recovered

Point Cloud Editing Result Caching

- Available since ReCap 7.1
- Need manually save the project frequently to maintain the performance

 1fac76cd-0430-45eb-83df-9e85221785fd.vch	5/25/2020 3:34 PM	VCH File
 6ce710ea-b2f0-4687-b532-289622e5d5d8.vch	5/25/2020 3:34 PM	VCH File
 7b418706-124b-49bd-a4b7-274507d37d90.vch	5/25/2020 3:34 PM	VCH File
 8fc8d9cd-bf32-41bd-8bb2-3e731f1cab54.vch	5/25/2020 3:34 PM	VCH File
 9a6bf7df-e745-4c73-b73a-ba65e3053cf2.vch	5/25/2020 3:34 PM	VCH File
 9bab2c62-b601-419d-a501-c1b6ebe7794a.vch	5/25/2020 3:34 PM	VCH File
 011b08aa-a170-4c19-9410-52525834c99a.vch	5/25/2020 3:34 PM	VCH File
 13f03ad8-3e55-4b83-b296-8b26fb5b9f69.vch	5/25/2020 3:34 PM	VCH File
 022bf401-548d-4496-9f81-914f83642eb4.vch	5/25/2020 3:34 PM	VCH File
 38e2c45b-b0d6-4d0d-ae8c-625c3023f7ef.vch	5/25/2020 3:34 PM	VCH File
 78d7e4fc-641a-42b9-ba6d-dedbf42a1841.vch	5/25/2020 3:34 PM	VCH File
 428a4b71-5fe7-4afe-b72f-43816b466f2b.vch	5/25/2020 3:34 PM	VCH File
 709e3061-78f2-43bc-89d3-1a3bfcf2900f.vch	5/25/2020 3:34 PM	VCH File

Manage Your ReCap Projects for Collaboration



ReCap Project File Types

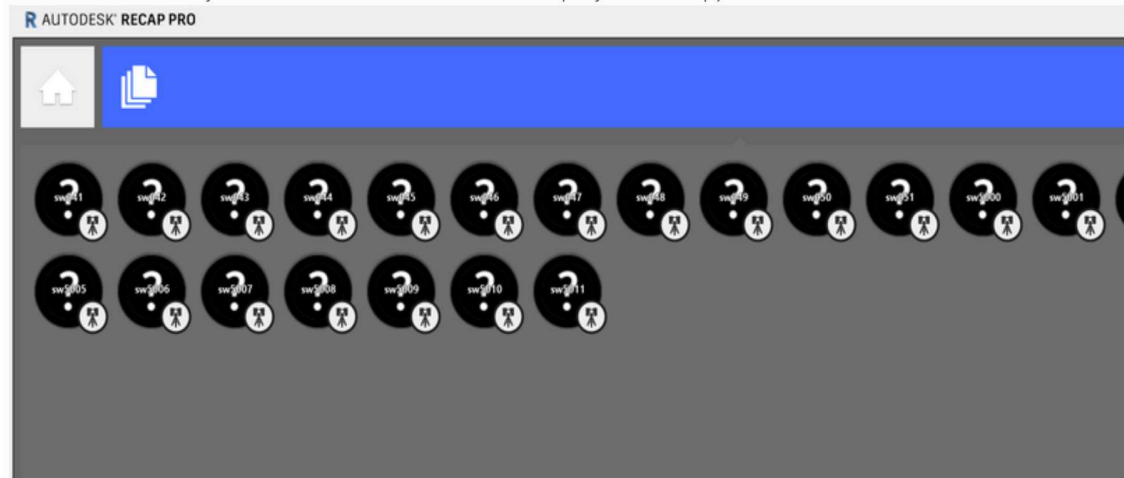
- **Support files**
 - RCS: Indexed 3D point cloud
 - RCC: Support structured scan related workflow
 - Thumbnail: Mirror ball in indexing page
 - Llt: Texture mapping for the mirror balls in 3D preview during registration
- **Temporary cached files**
 - Make project loading faster
 - Realview
 - Minimap
 - Registration view
 - etc.
 - Can be regenerated

Creating Child Projects

- **Registration is done outside ReCap or done before indexing**
 - RCS file carries the transform information
 - No need to re-register when creating new child projects
- **Registration is done after indexing**
 - RCP file saves the new scan transform information
 - May require re-registerer
- **Support files (.RCS / .RCC) remains in the parent projects**
- **Cache files need to be regenerated**

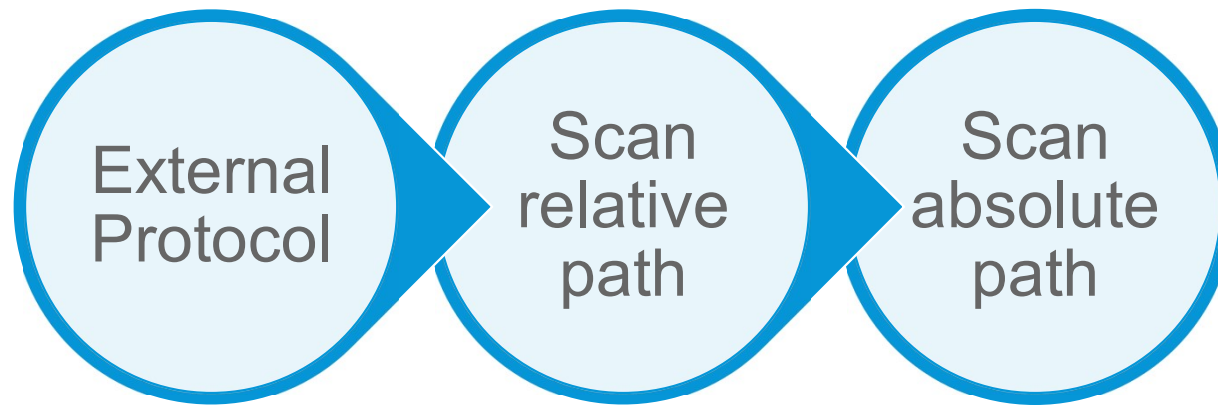
Moving Your Project Around

- Files missing?
- Slow to open the project?
- Folder structured changes?
- Linked files are located on network drive?

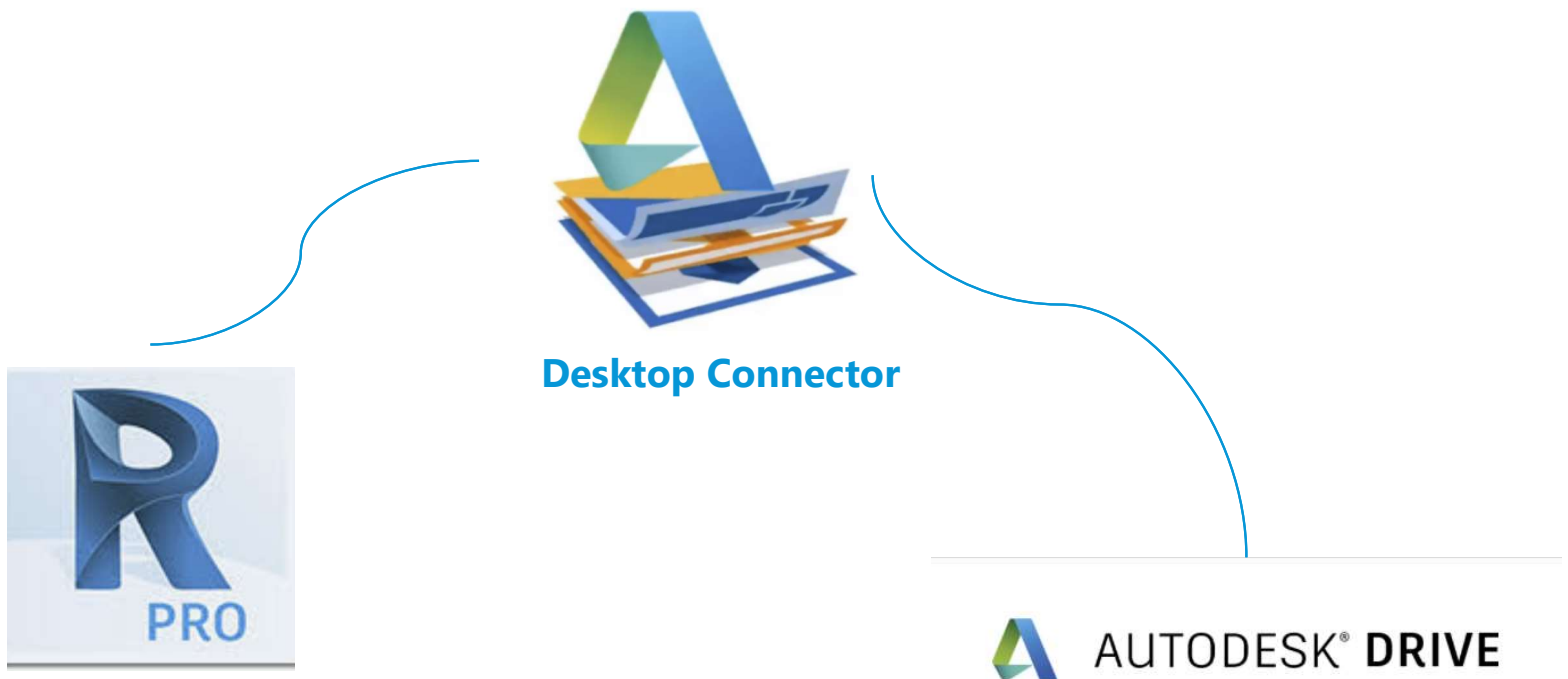


Moving Your Project Around

- File search path order

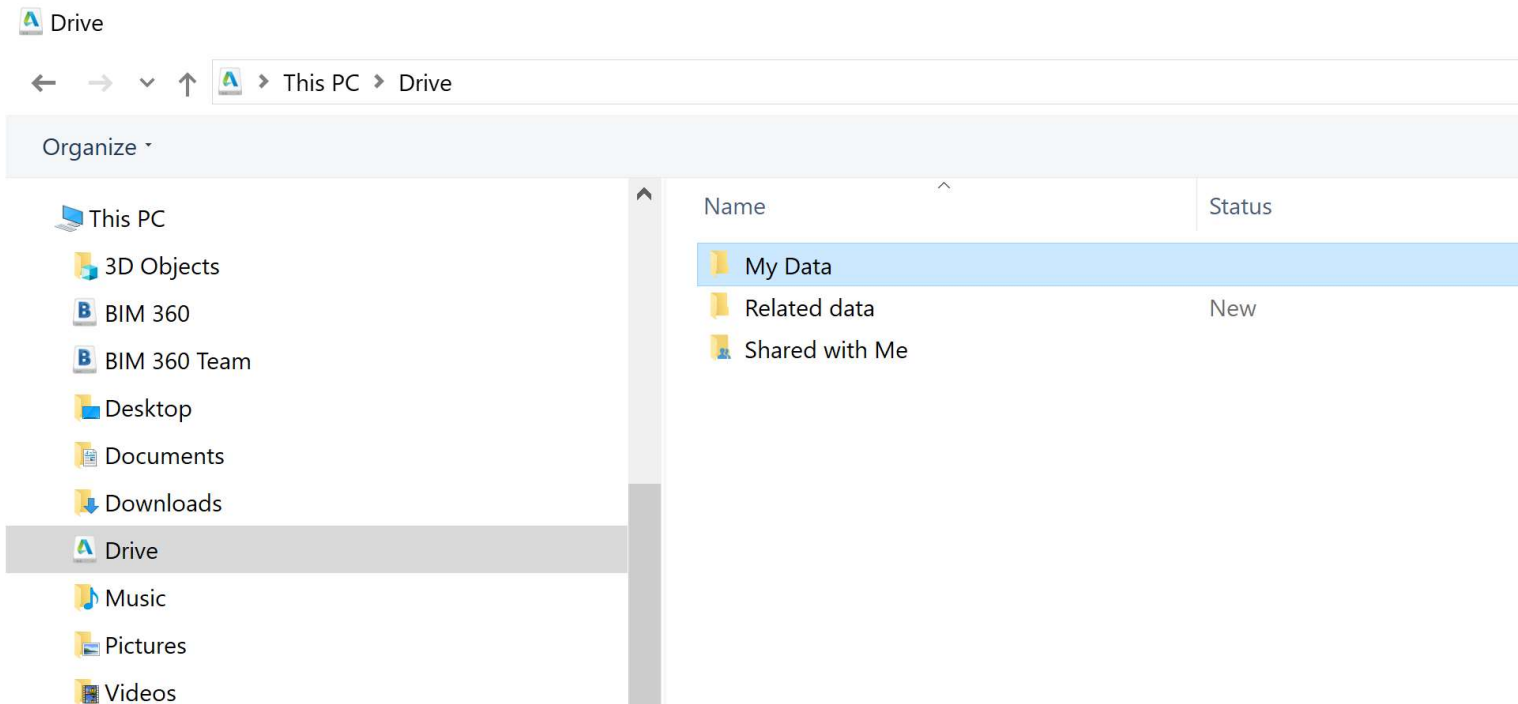


Autodesk Drive Migration



Autodesk Drive

- **Workspace**



Publish through Desktop Connector

- Publish dialog

Space required **71.54 MB**

Project name

Select Autodesk Drive location to publish

▼ Select scans

☒ all
☒ p10

- Status in Desktop Connector

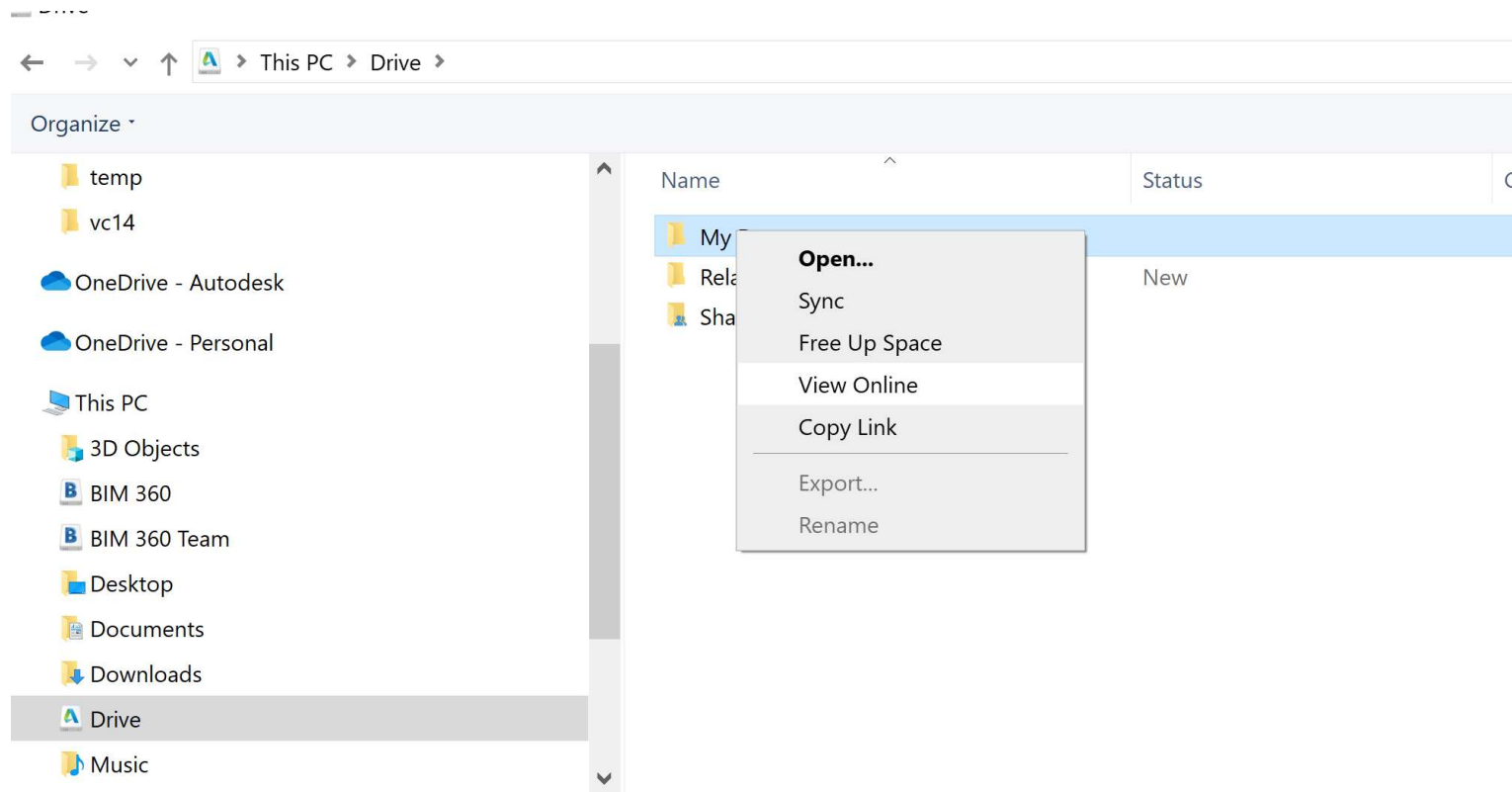
Pending Actions				
Time	Name	Action	Source	State
10/18/2020 8:09 PM	p10.rcc	Add Files	Drive	Running
10/18/2020 8:10 PM	efa352...	Add Files	Drive	Pending

Icon	Name	Path	Status
------	------	------	--------

Message

Pending Action Count: 2

View The Project Online





HouisiestHouse.rcp

Download

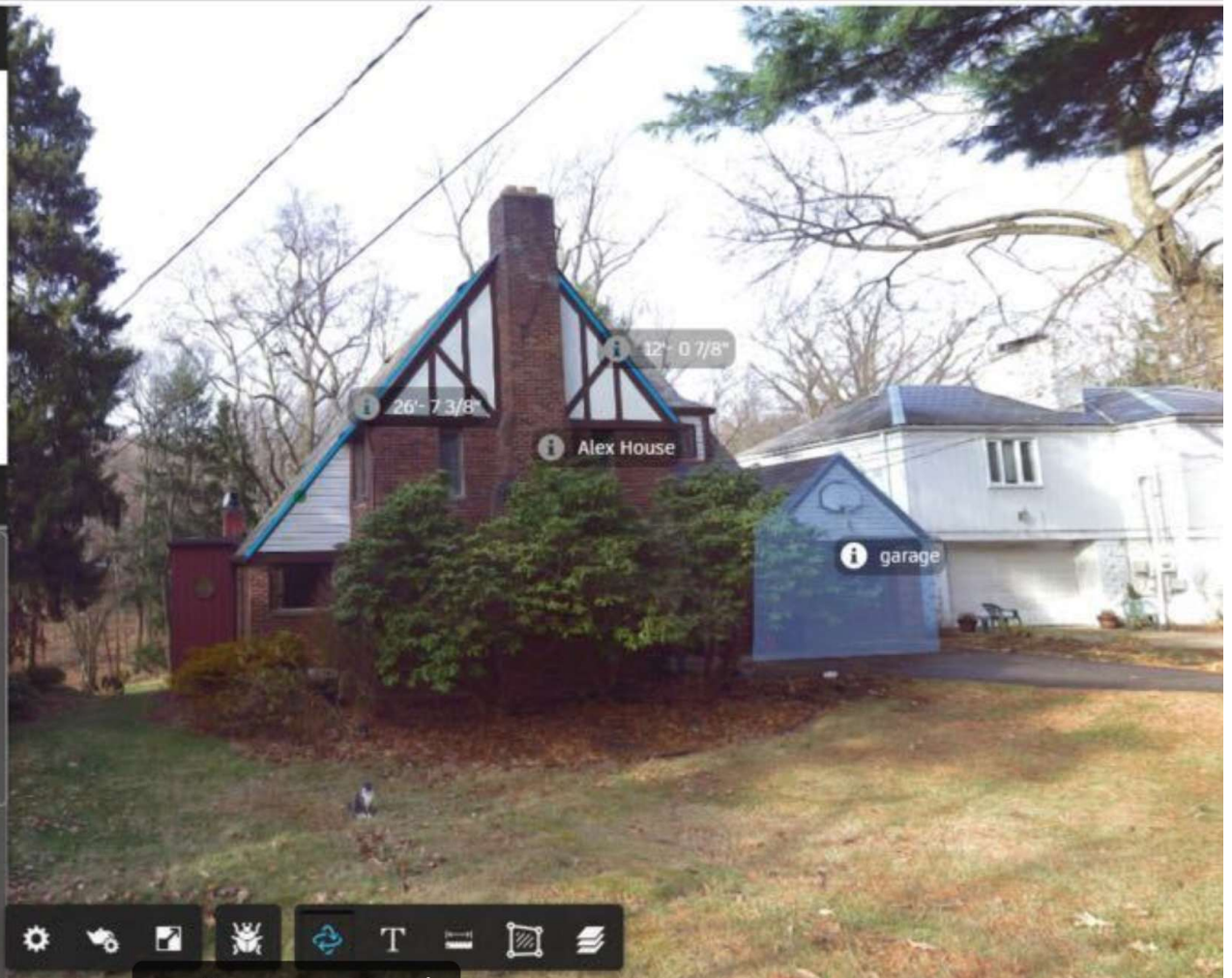
Project Browser




Scans

Annotations

Alex House		
Alex Cat - hidden		
contrabass		
Painting on the wall - hidden		
2'- 5 1/8"		
4'- 1 6/8"		
2'- 10 3/8"		
26'- 7 3/8"		



Collaboration

 AUTODESK DRIVE


My Data

Shared with Me

Upload

New Folder

Sync files and work from your desktop with Desktop Connector



Get Desktop Connector

My Data

Name

↑

Name	Last Updated	Created By
A360 Drive Migration	4 months ago	Yan Fu
addRCCFiles	a month ago	Yan Fu
addRCCFiles2	3 months ago	Yan Fu
addRCCFiles3	3 months ago	Yan Fu
addRCCFiles-1	4 months ago	Yan Fu
AutodeskReCapSampleProject	4 months ago	Yan Fu

My Data

×

Type

Folder


Last Modified


Yan Fu modified: a day ago

Created

Yan Fu uploaded: a year ago

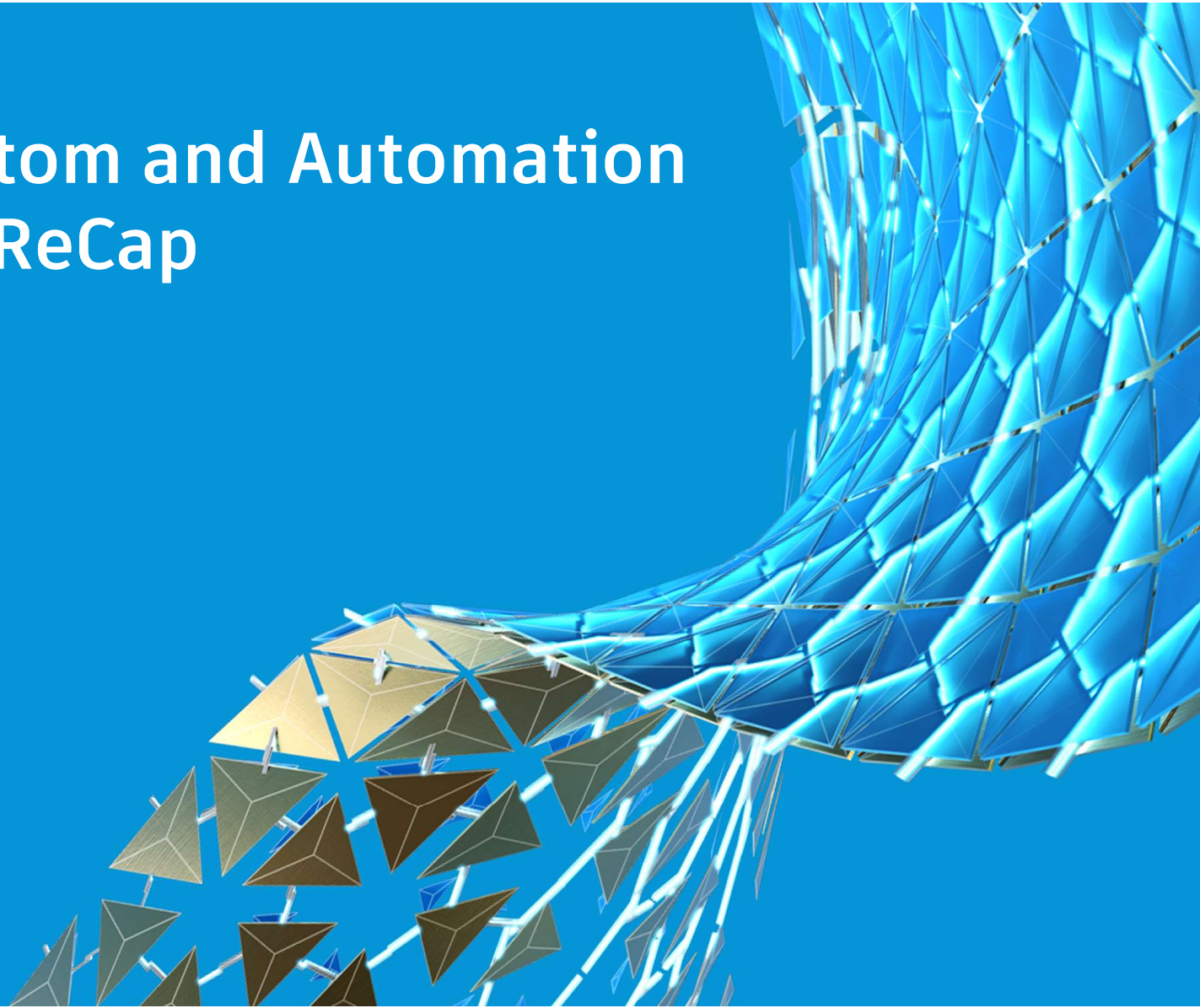
Collaborators





2

Discover Custom and Automation Workflow of ReCap



DeCap.exe

CREATE RECAP PROJECTS FROM RAW SOURCE FILES IN AN AUTOMATED, BACKGROUND FASHION

DECAP IS AUTHORIZED USING THE SAME LICENSE AS RECAP PRO

```
Decap.exe --importWithLicense <output  
folder> <project name> [options] <input scan 1>  
[input scan 2] ... [input scan N]
```

Reality Solutions SDK Developer Center



Help your customers quickly get their reality data into their Autodesk design and construction tools by including support for the industry's most prolific point cloud format.

The Reality Solutions SDK gives your solution the ability to read in the spatial data, spherical range images, and other metadata in the RCP/RCS format. When your customer is ready to save their project from your solution, the SDK provides the ability to write out the RCP/RCS project. Avoid having to convert formats, eliminating hours of time from your customers' workflows.

Add support for your reality-data format through our Capture Codec Kit (CCK). Any format can now be exported to the Autodesk point cloud format (RCP/RCS).

Reality Solutions SDK (ReCap SDK)

- **C++ desktop SDK for**
 - Reading
 - Writing
 - Editing
 - Querying
 - Traversing

Reality Solutions SDK

ability to write out the RCP/RCS project within your own application

- **Export your file to RCP / RCS**
 - Supported through Capture Codec Kit (CCK)
- **Export point cloud data from a buffer**
 - Write your data stream into RCP / RCS
 - Without writing to an intermediate file

Reality Solutions SDK

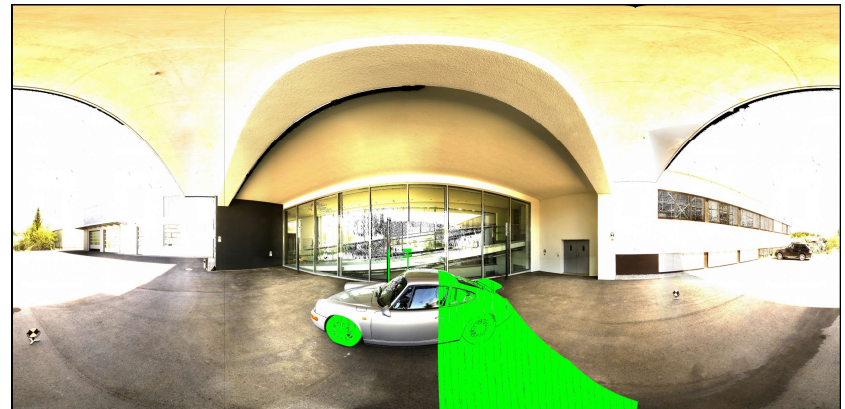
EXPORT 360 PANORAMA IMAGES FOR STRUCTURED SCANS



Reality Solutions SDK

REMOVE DELETED POINTS FROM SPHERICAL SCANS

Available in ReCap SDK 21.1.0



Additional Resources

[ReCap Community Forum](#)

- Monitored by ReCap Dev / QA
- Latest announcement

This board

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Q















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	A360 Drive retirement  by  karthik.nathan 2 weeks ago	0 REPLIES	130 VIEWS	
	Announcing the Global Community Games 2020!   by  lim.wendy 3 weeks ago	0 REPLIES	74 VIEWS	
	We created it, you NAME it...   by  lim.wendy on 08-05-2020 09:22 PM	0 REPLIES	138 VIEWS	



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