

Point Cloud for Rhino Help

Table Of Contents

Point Cloud for Rhino Help	1
Introduction	2
ReadMe	3
Contact	4
License Agreement	5
Command Reference	12
PCImportPoints.....	13
PCDrapeSurface.....	16
PCWrapMesh	18
PCHelp	19
PCRegister	20
PCAbout	22
Tutorials	23
Tutorial 1 - Drape a surface over a point cloud.....	24
Tutorial 2 - Wrap a mesh around a concave point cloud.....	31
Tutorial 3 - Wrap a mesh around a convex point cloud.....	38

Point Cloud for Rhino Help

Welcome to *Point Cloud for Rhino* Help!

This help file provides all the information you need to understand and use *Point Cloud for Rhino*. Click the links below or use the Contents tab on the left to browse help topics. You can also scroll the topics on the above right hand pane.

The *Point Cloud for Rhino* help file is divided into the following sections:

- [Introduction](#) - Introduction to *Point Cloud for Rhino*.
- [Command Reference](#) - Quick reference of all the commands added by *Point Cloud for Rhino*.
- [Tutorials](#) - Tutorials to get you started in the shortest possible time.

If you need any additional information please [contact](#) SYCODE.

Note:

- If you are having trouble loading the *Point Cloud for Rhino* plug-in file into the Rhino environment please refer to the [ReadMe](#) file.
- Please read the [License Agreement](#) before using the software.

Introduction

Point Cloud for Rhino is a reverse engineering plug-in for Rhinoceros. This plug-in gives Rhino the ability to reconstruct the geometry of an object from a point cloud which describes it.

Point Cloud for Rhino can drape a surface over a point cloud or wrap a mesh around a point cloud. Draping a surface is similar to laying a piece of cloth over an object. The surface is deformed to take the shape of the object along the drape direction. A surface can be draped along one of the six orthogonal directions (top, bottom, front, back, right and left) or a custom user specified direction. Wrapping a mesh is similar to wrapping cloth all around an object to close it completely. *Point Cloud for Rhino* has the ability to wrap a mesh around a concave or a convex point cloud.

Point Cloud for Rhino is designed to work with the following versions of Rhino:

- Rhino 5.0 (64 Bit)
- Rhino 4.0, 5.0 (32 Bit)
- Rhino 3.0

Point Cloud for Rhino is designed to be extremely user friendly and easy to understand. Once installed, it automatically loads itself into the Rhino environment. If automatic loading fails there are manual loading instructions in the [ReadMe](#) file. Once loaded it adds new commands to Rhino's existing commands and a new submenu called "PointCloud" to the Rhino menu containing these newly added commands.

Point Cloud for Rhino comes with detailed documentation for each command as well as a set of [tutorials](#) to get you started in the shortest possible time.

If you need any additional information please [contact](#) SYCODE.

ReadMe

This is the *PointCloud for Rhino* ReadMe file.

PointCloud for Rhino is a plug-in for Rhinoceros. PointCloud for Rhino adds several new commands to Rhino. It also adds a new menu to the Rhino menu called "PointCloud" which contains these newly added PointCloud commands.

Automatic Loading:

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PointCloud for Rhino has to be loaded into the Rhino before it can be used. The installer does this automatically. The next time you run Rhino you will see the "PointCloud" menu added to the Rhino menu. Due to an installation problem, if the "PointCloud" menu does not appear then you will have to manually load the plug-in into Rhino.

Manual Loading:

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The PointCloud for Rhino plug-in files are installed into the PointCloud for Rhino installation folder (typically "C:\Program Files\SYCODE\PointCloud for Rhino\"). The plug-in files have an extension of ".rhp". There is one plug-in file for each version of Rhino. The plug-in file name indicates the version of Rhino that it has been designed for.

The list of plug-in files along with the version of Rhino is shown below. Please be sure to use the plug-in file that corresponds to your version of Rhino.

```
PointCloud_VC60.rhp    -> Rhino 3.0
PointCloud_VC80.rhp    -> Rhino 4.0, 5.0 (32 Bit)
PointCloud_VC80x64.rhp -> Rhino 5.0 (64 Bit)
```

To load PointCloud for Rhino into Rhino please follow the steps listed below:

- (1) Start Rhino
- (2) Type "PlugInManager" at the command prompt and press "Enter"
- (3) Click the "Install" button.
- (4) Browse for the plug-in file for your version of Rhino in the PointCloud for Rhino installation folder.
- (5) Click the "Open" button.
- (6) Click the "Close" button.

Usage:

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PointCloud for Rhino adds a new menu to Rhino called "PointCloud". All the PointCloud commands can be invoked from this new menu.

Support:

=====

For support, please E-Mail support@sycode.com

Contact

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Command Reference

Point Cloud for Rhino adds a new submenu to the Rhino menu called 'PointCloud'. The PointCloud submenu consists of the following commands:

PCImportPoints	Imports a point cloud from a text file
PCDrapeSurface	Drapes a surface over a set of a point cloud
PCWrapMesh	Wraps a mesh around a point cloud
PCHelp	Displays the <i>Point Cloud for Rhino</i> help file
PCRegister	Registers your copy of <i>Point Cloud for Rhino</i>
PCAbout	Displays the <i>Point Cloud for Rhino</i> about box

PCImportPoints

Menu Button PointCloud > Import Points

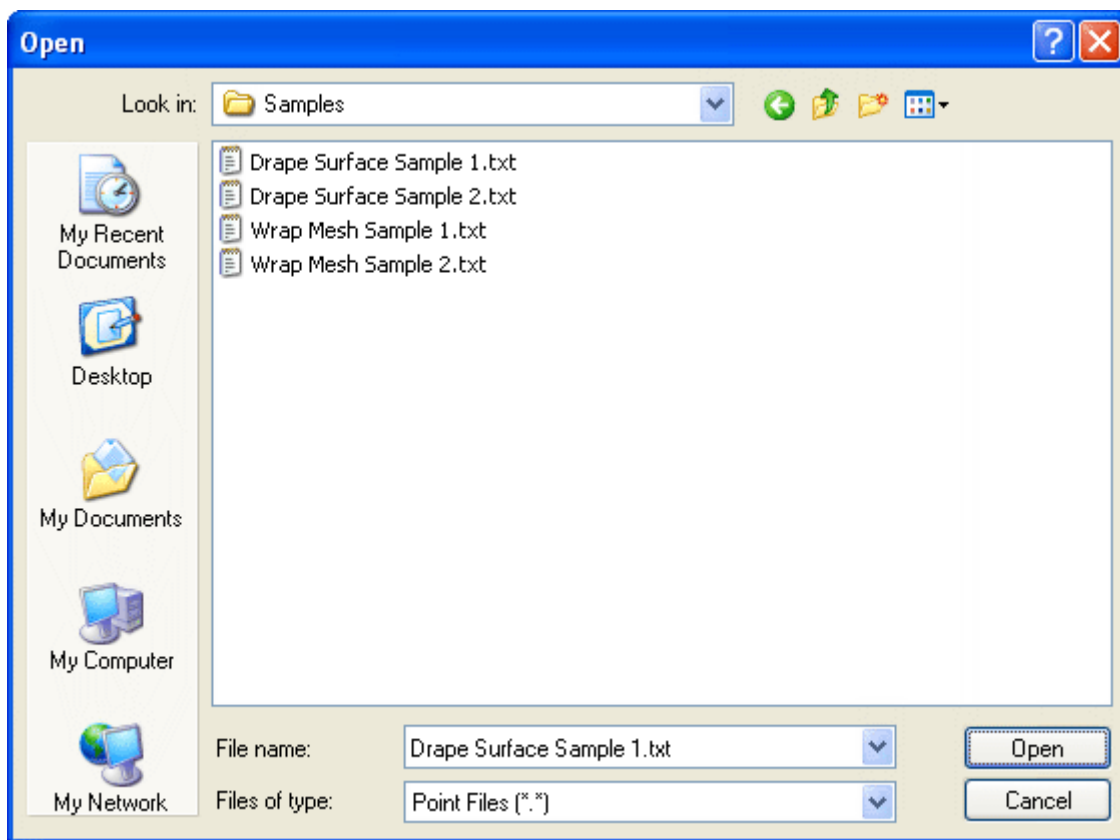
Command PCImportPoints

This command imports points from a text file. This command invokes the Point File dialog (shown below) which allows you to select the point file to import and set the file format and delimiters.

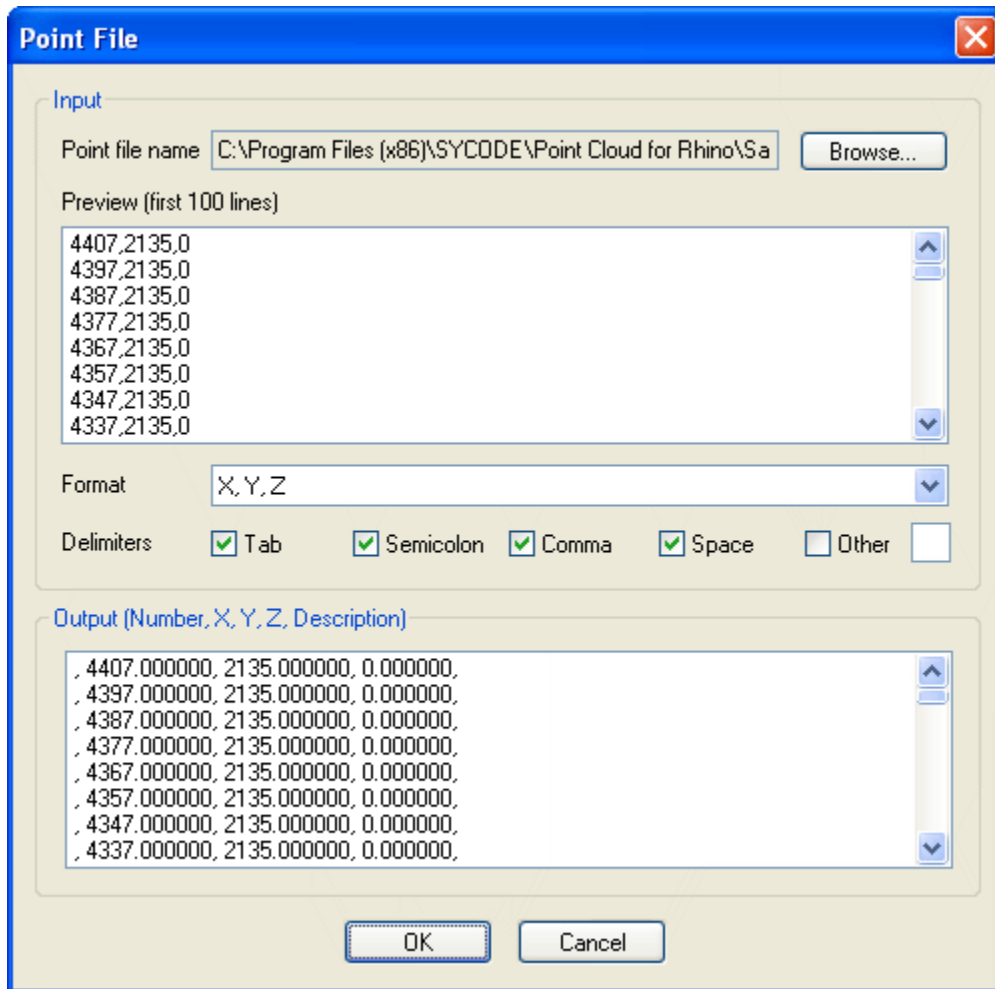
To import Points

1. Click *Import Points* from the *PointCloud* menu or type *PCImportPoints* at the Rhino command prompt.

2. The *Point File* dialog box is displayed. Browse for the Point file you wish to import. At the Open dialog box select the file and click *Open*.



3. Select the format and delimiters in the *Point File* dialog box and click *Ok*.



Explanation

-

Format

Each line of the text file is assumed to contain data related to a single point. The point data must contain the X, Y and Z coordinates of the point and may contain a point number and point description. The point number (if it exists) must be present before and coordinate data and the point description (if it exists) must be present after the coordinate data. The point coordinates can be in the X, Y, Z format or the Northing, Easting, Elevation (Y, X, Z) format. The general format can be described as:

[Point Number] [Point Coordinates] [Point Description]

Delimiters

The most commonly used delimiters are Tab, Semicolon, Comma and Space. You can specify a custom delimiter as well.

How it works

Browse for the text file by clicking the "Browse" button. After selecting the text file the Preview list box will show you the first 100 lines of the text file. Then proceed to select the format of the text file by selecting the appropriate value from the Format drop list. Also select/unselect the delimiters. The output list box will show you the points read from the text file based on the current values of format and delimiters. When you are satisfied with the contents of the output list box click the OK button and the points will be imported into Rhino.

Note:

- Point numbers and descriptions are not imported.

PCDrapeSurface

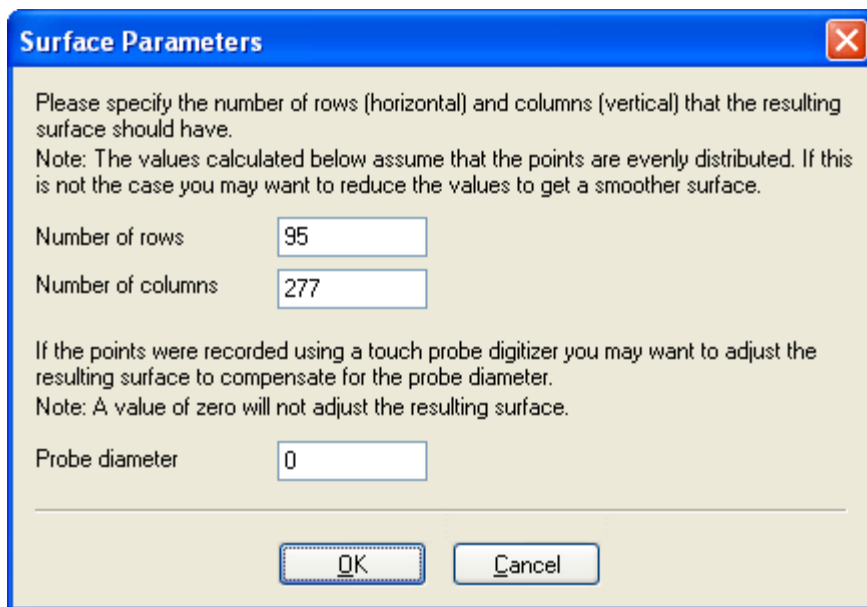
Menu Button PointCloud > Drape Surface

Command Name PCDrapeSurface

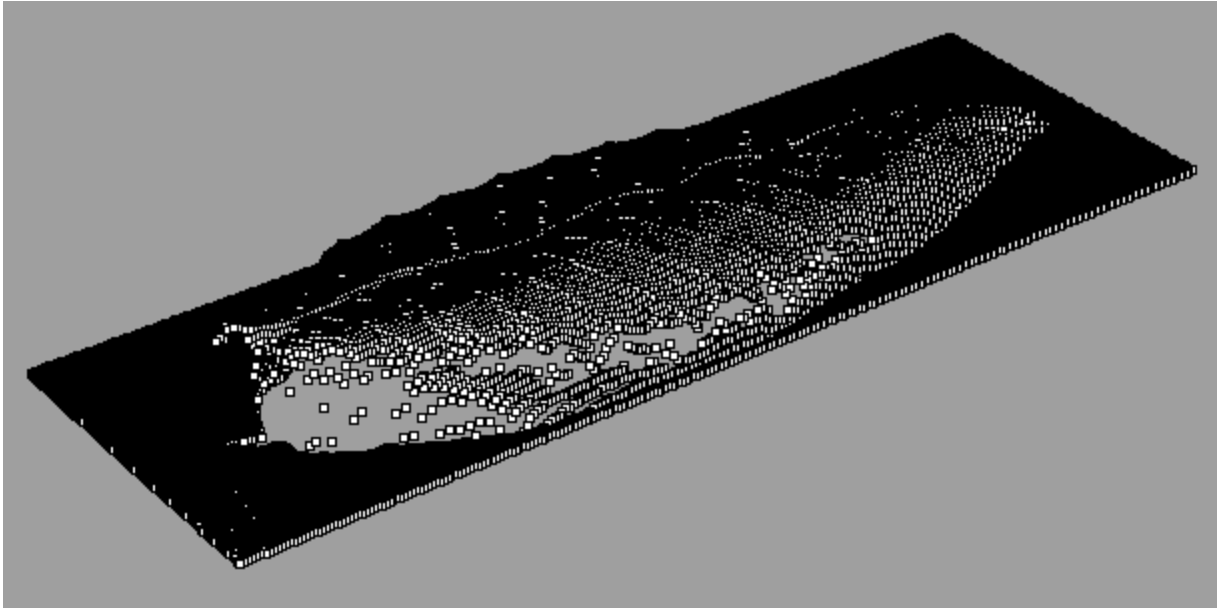
This command drapes a surface over a point cloud.

To drape a surface over a point cloud

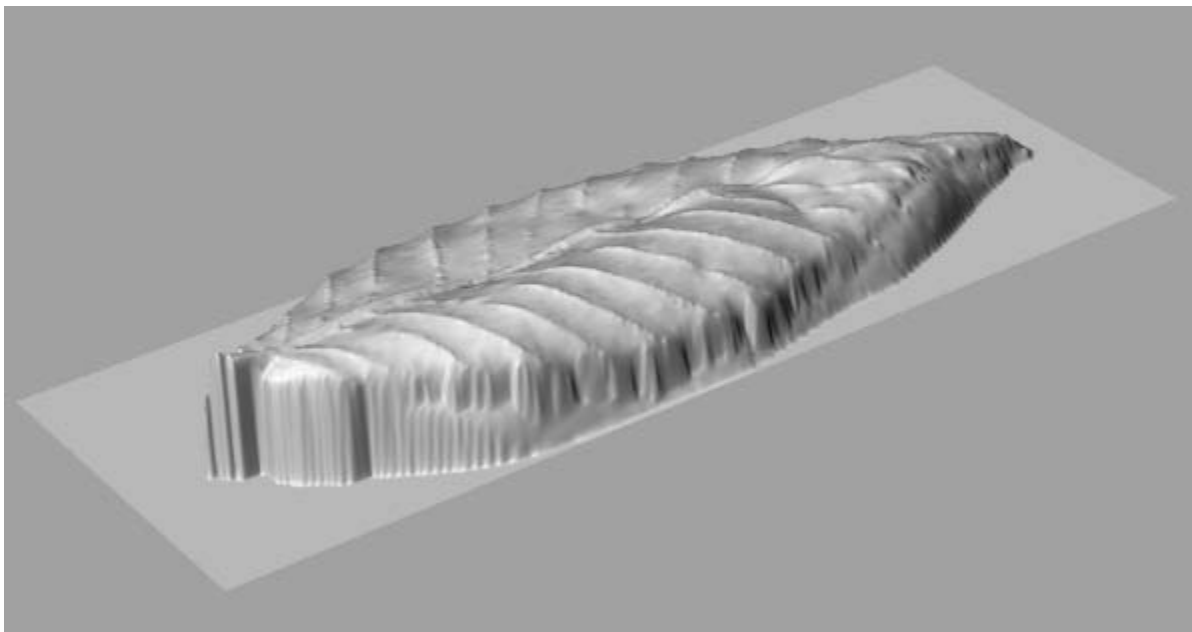
1. Click *Drape Surface* from the *PointCloud* menu or type *PCDrapeSurface* at the Rhino command prompt.
2. At the **Select Points** (DrapeDirection SurfaceType) prompt, set the command options, select the points and click *Enter*.
3. The *Surface Parameters* dialog box is displayed. Specify the parameters and click *Ok*.



The above fig is set as the default



Input point cloud



A NURBS surface draped over a point cloud

PCWrapMesh

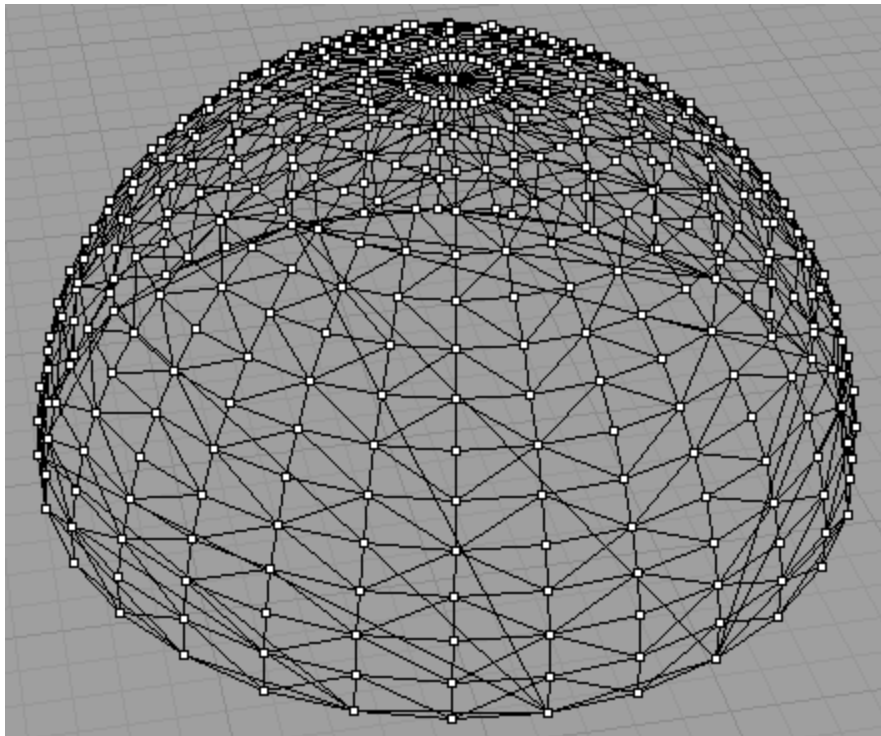
Menu Button PointCloud > Wrap Mesh

Command PCWrapMesh

This command wraps the mesh of the Point Cloud file.

To wrap a mesh over a point cloud

1. Click *Wrap Mesh* from the *PointCloud* menu or type *PCWrapMesh* at the Rhino command prompt.
2. At **Select Points** (PointCloudType) prompt, set the command options, select points and press *Enter*.



PCHelp

Menu Button	PointCloud > Help
Command	PCHelp

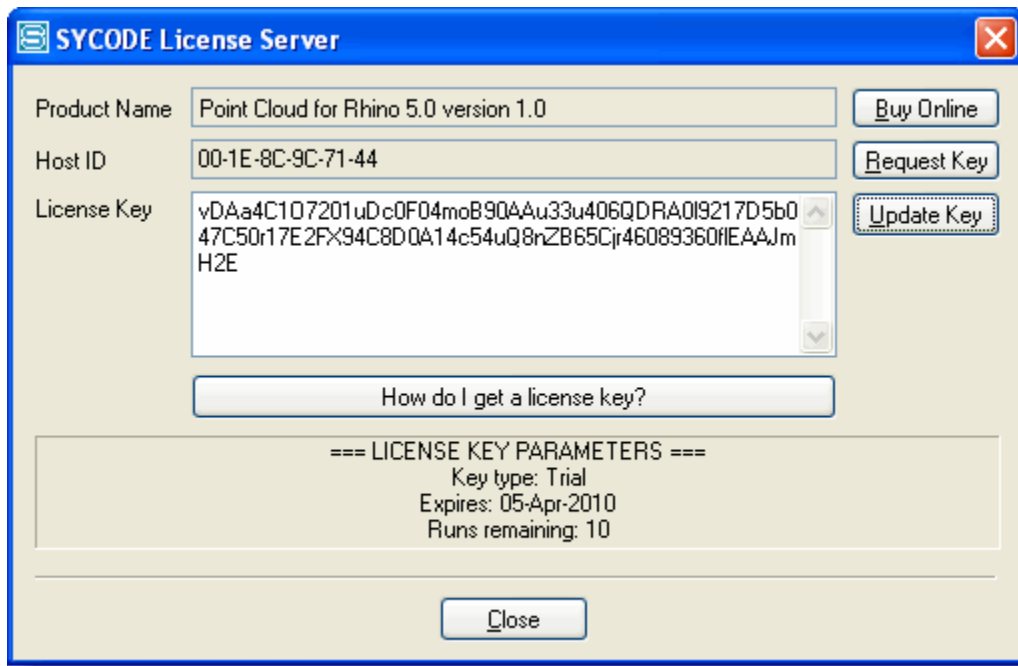
This command displays the help file. The [Welcome](#) page is a good place to start.

PCRegister

Menu Button	PointCloud > Register
Command	PCRegister

This command is used to register your copy of *Point Cloud for Rhino*

You need a license key to start using the software. A license key can be of two types: Trial or Permanent. A trial key is issued to you instantly and completely free of cost so that you may try the software before you purchase a license. A permanent key is issued after you have purchased a license.



- **How do I get a Trial Key?**
- Simply click the 'Request Key' button and select 'TRIAL KEY' as the type of key being requested. Fill the form and submit it. A trial key will be immediately sent to you by email.

How do I get a Permanent Key?

- To get a permanent key you need to have already purchased a license. If you have not yet purchased a license you can do so by clicking the 'Buy Online' button. After you place your order click the 'Request Key' button and select 'PERMANENT KEY' as the type of key being requested. Fill the form and submit it. Your order will be verified and a permanent key will be sent to you by email within one business day.

IMPORTANT:

- (1) Please ensure that your computer is connected to the internet before you request for a key.

Command Reference

- (2) Please be sure to enter a valid email address as the key will be sent to you by email.
- (3) To avoid disruption in your work-flow we urge you to place your order before the trial period ends.

- If you need anything else please send an email to register@sycode.com

PCAbout

Menu Button PointCloud > About

Command PCAbout

This command is used to display the *Point Cloud for Rhino* about box. The about box lists the software and its version



Tutorials

The purpose of these tutorials is to provide the necessary information and hands-on experience to enable you to use *Point Cloud for Rhino*

The tutorials are designed to get you started with *Point Cloud for Rhino* in the shortest possible time.

- [Tutorial 1](#): Drape a surface over a point cloud
- [Tutorial 2](#): Wrap a mesh around a concave point cloud
- [Tutorial 3](#): Wrap a mesh around a convex point cloud

Note:

- The files used in these tutorials can be found in the Samples folder. (Typically C:\Program Files\SYCODE\Point Cloud for Rhino\Samples\)

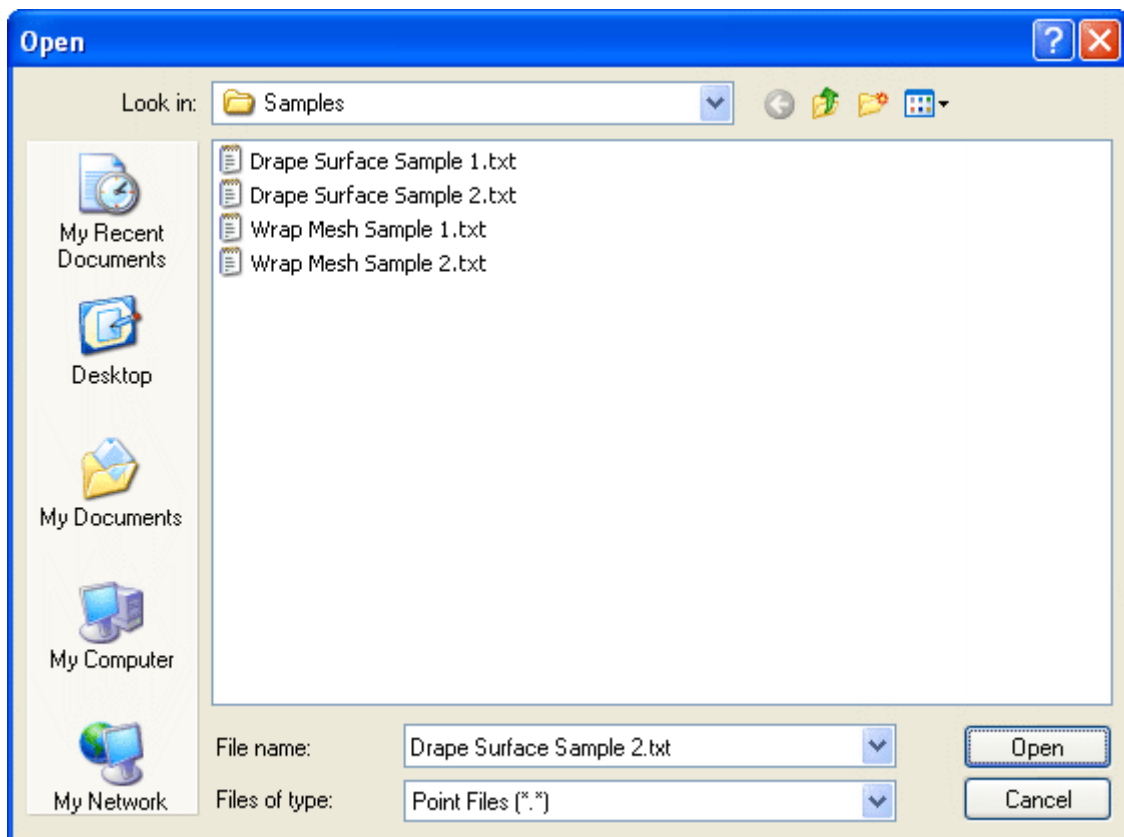
Tutorial 1 - Drape a surface over a point cloud

In this tutorial we will drape a surface over a point cloud.

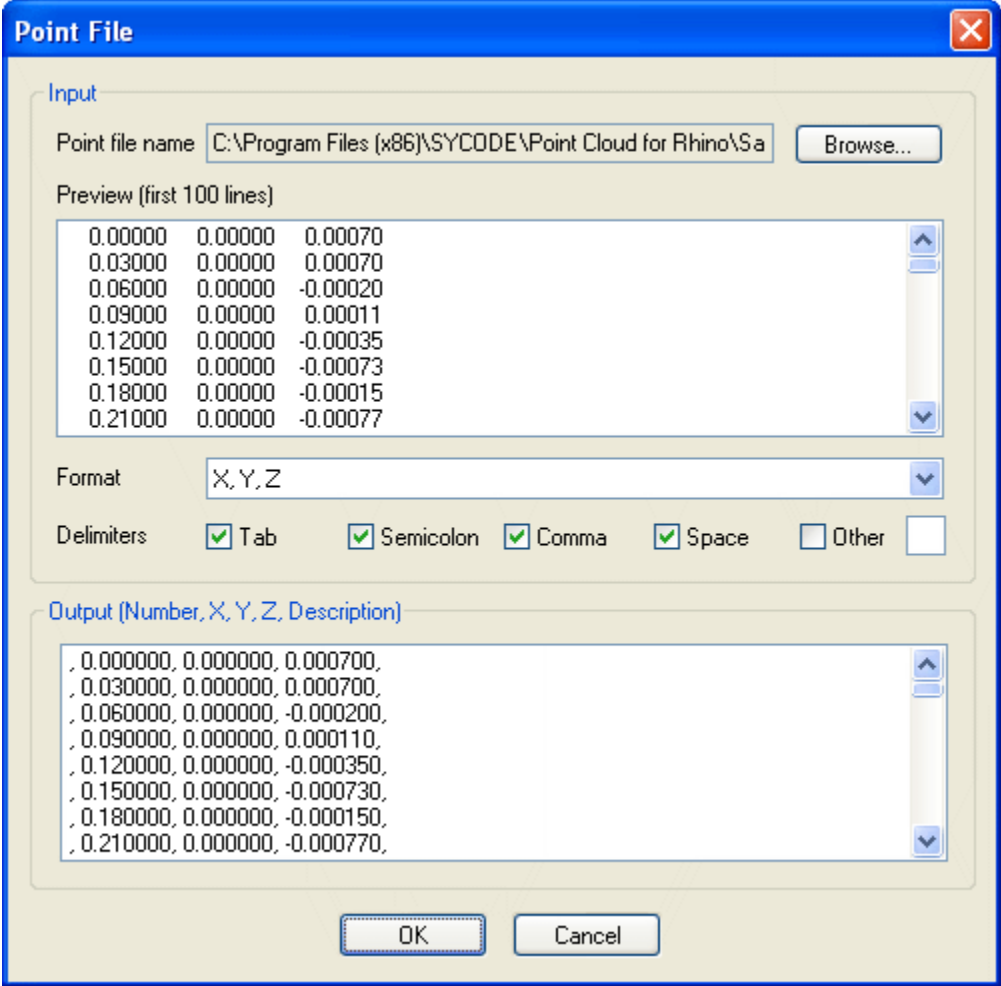
Step 1: Start Rhino.

Step 2: Click *Import Points* from the *PointCloud* menu or type *PCImportPoints* at the Rhino command prompt.

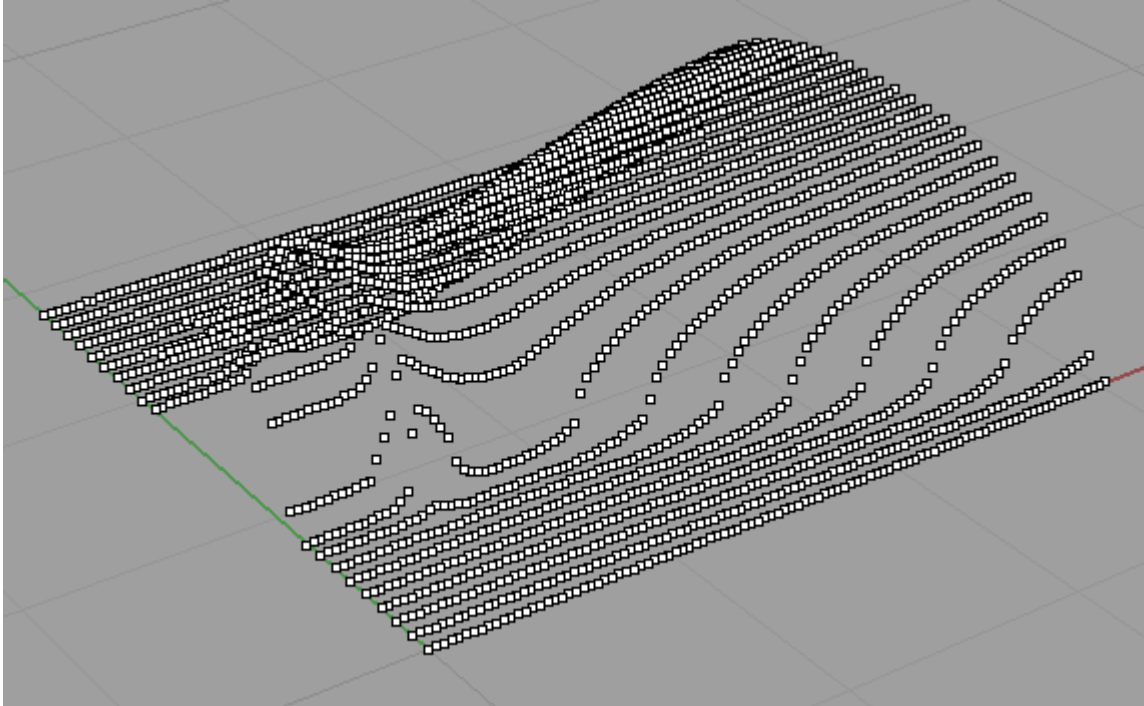
Step 3: The *Point File* dialog box is displayed. Browse for the file *Drape Surface Sample 2.txt* (typically located in *C:\Program Files\SYCODE\Point Cloud for Rhino\Samples*) and click *Open* from the *Open* dialog box.



Step 4: Select the format and delimiters in the Point File dialog box and click *OK*.



Step 5: Zoom to the extents of the drawing (View->Zoom->Extents). You will find the points from *Drape Surface Sample 2.txt* imported into the current model.

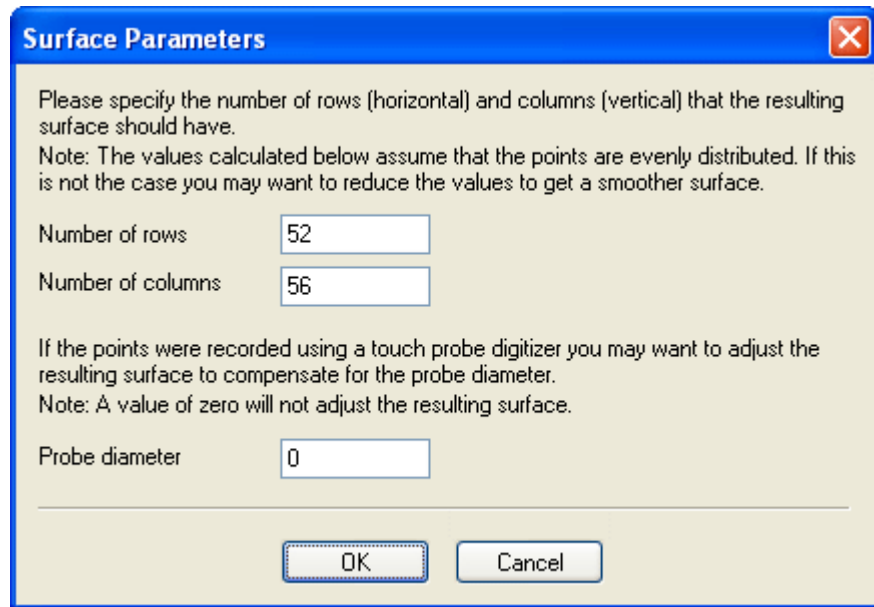


Step 6: Click *Drape Surface* from the *PointCloud* menu or type *PCDrapeSurface* at the Rhino command prompt.

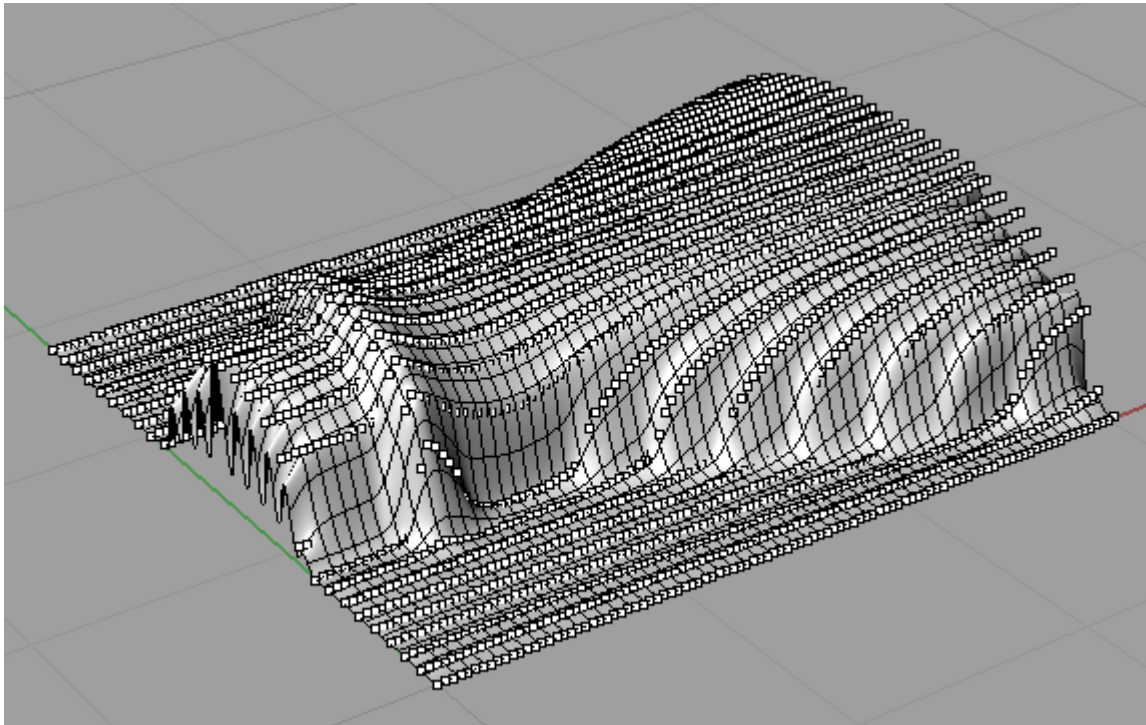
Step 7: Set the command options, select the all points and click *Enter*.

```
Command: _PCDrapeSurface  
Select points ( DrapeDirection=Top SurfaceType=NurbsSurface ):
```

Step 8: The *Surface Parameters* dialog box is displayed. Do not modify the parameters. Click *Ok* to accept the default values.



A NURBS surface is draped over the point cloud. As you can see the surface is highly uneven.

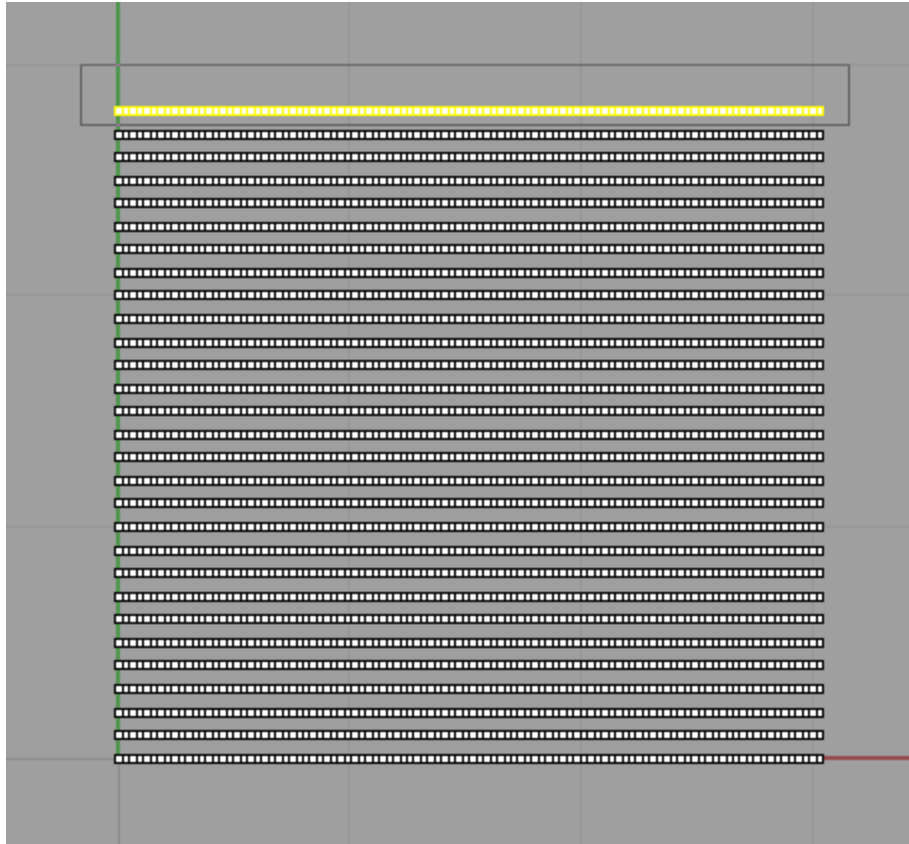


This is because the points are not evenly spaced although the points seem to be in the form of a regular matrix. The calculated values for rows and columns are 52 and 56 respectively. Let us now find out how many rows and columns of points are actually present.

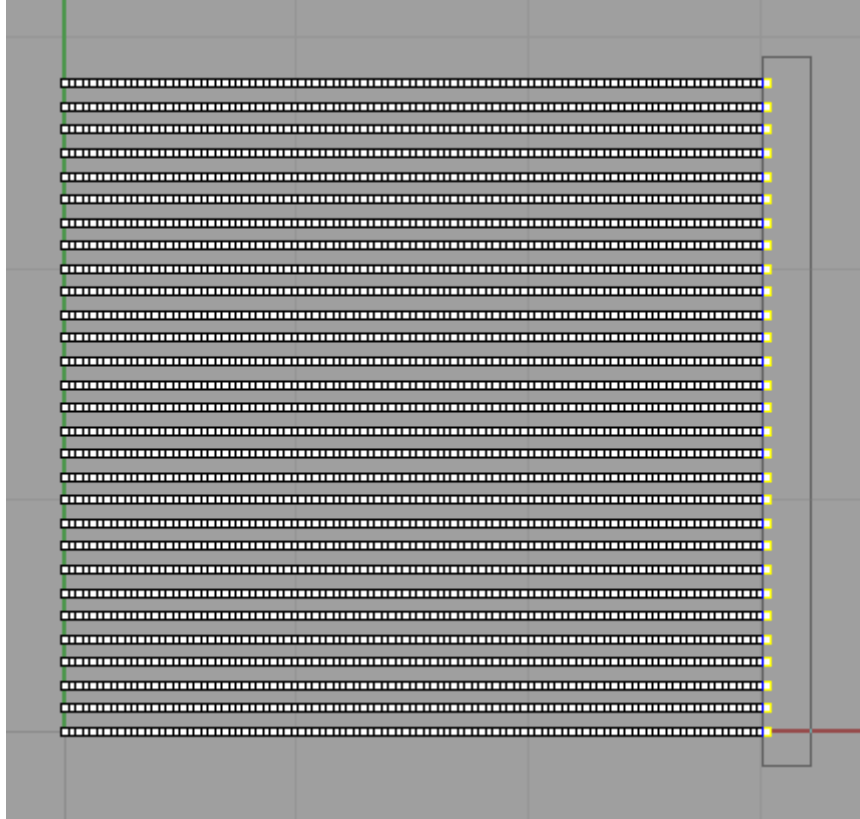
Point Cloud for Rhino Help

Step 9: Delete the surface, switch to the top view and zoom to the extents of the model

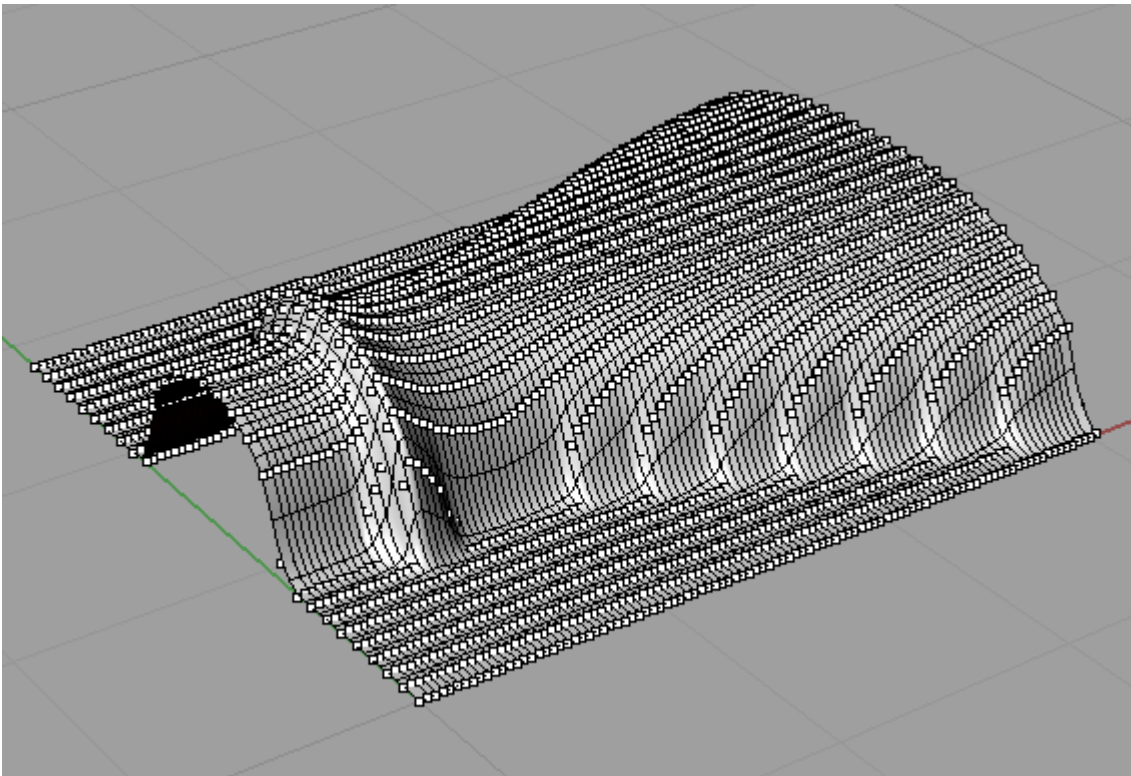
Step 10: Drag select the top most row of points as shown below and notice that the command prompt reports "*102 points added to selection*". So we now know that there are 102 columns of points.



Step 11: Drag select the right most column of points as shown below and notice that the command prompt reports "*29 points added to selection*". So we now know that there are 29 rows of points.



Step 12: Repeat Step 6 and this time enter 102 and 29 for the number of columns and rows respectively. This time we get the required even surface.



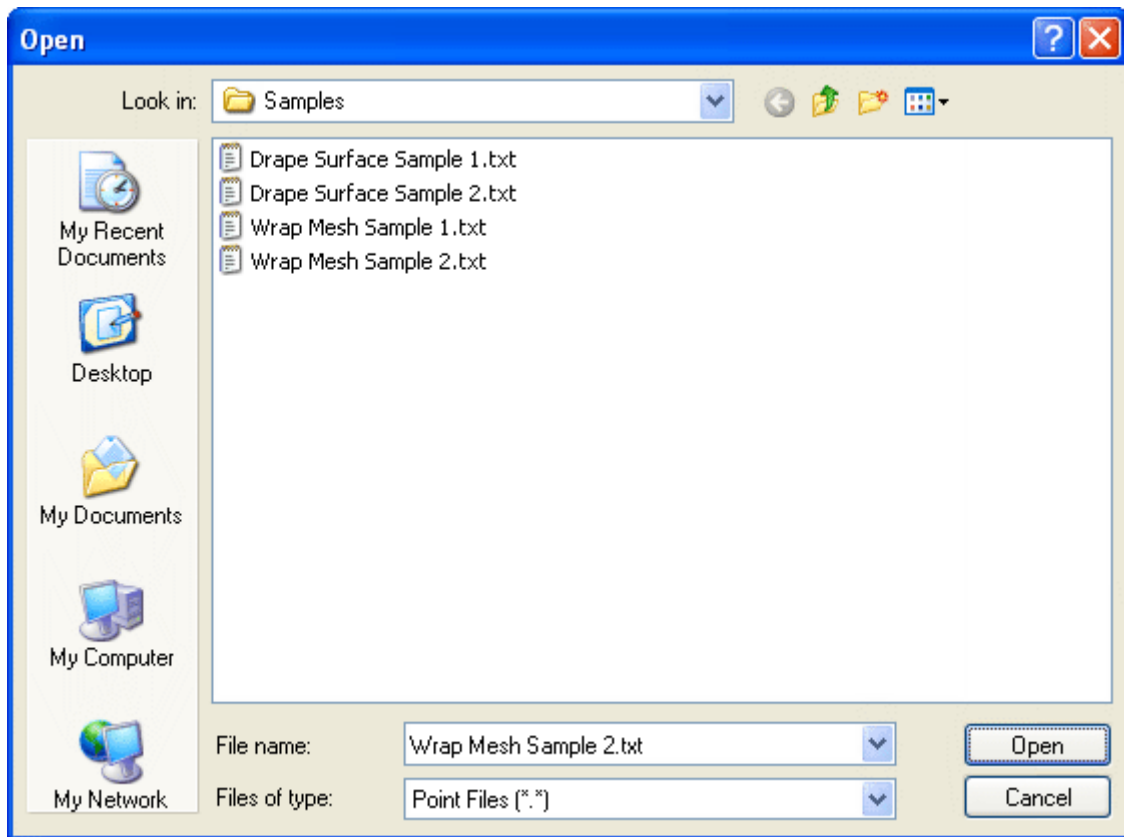
Tutorial 2 - Wrap a mesh around a concave point cloud

In this tutorial we will learn how a mesh is wrapped around a point cloud.

Step 1: Start Rhino.

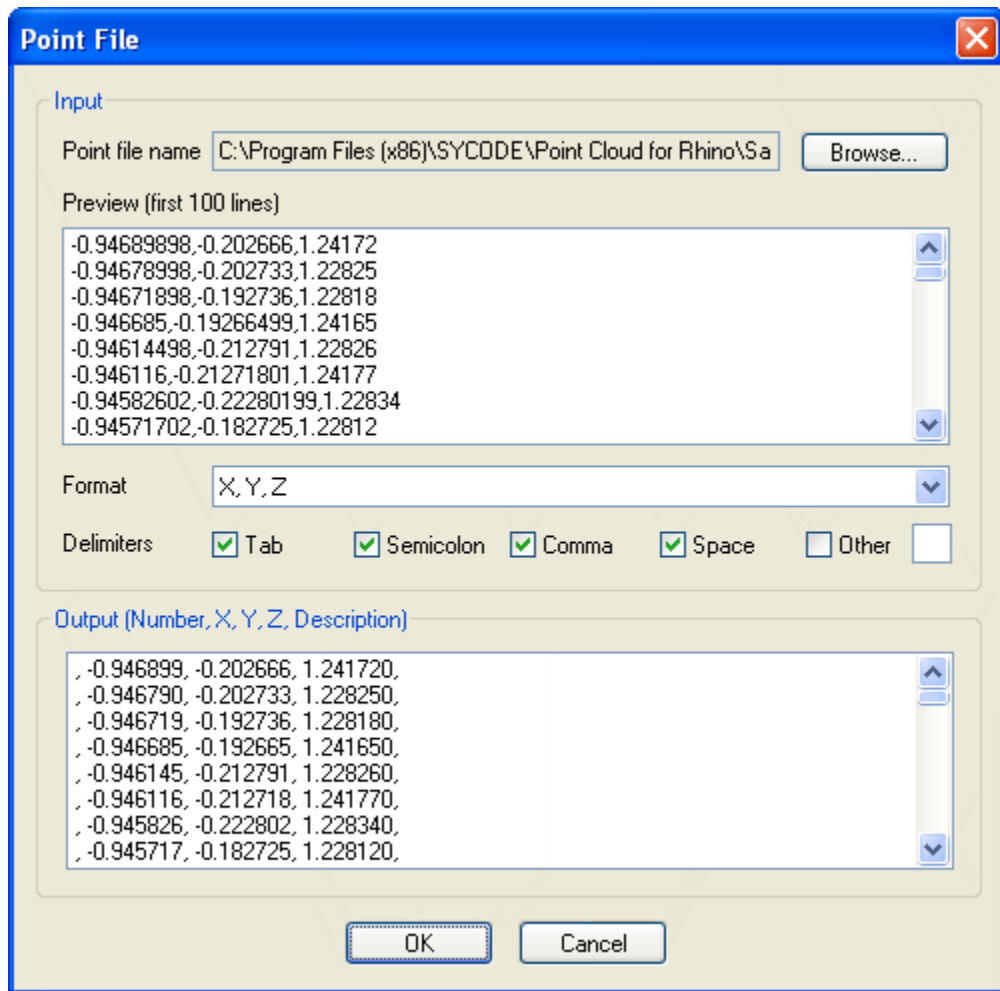
Step 2: Select *Import Points* from the *PointCloud* menu or type *PCImportPoints* at the Rhino command prompt and press *Enter*.

Step 3: The *Point File* dialog box is displayed. Browse for the file *Wrap Mesh Sample 2.txt* (typically located in *C:\Program Files\SYCODE\Point Cloud for Rhino\Samples*) and click *Open* from the *Open* dialog box.

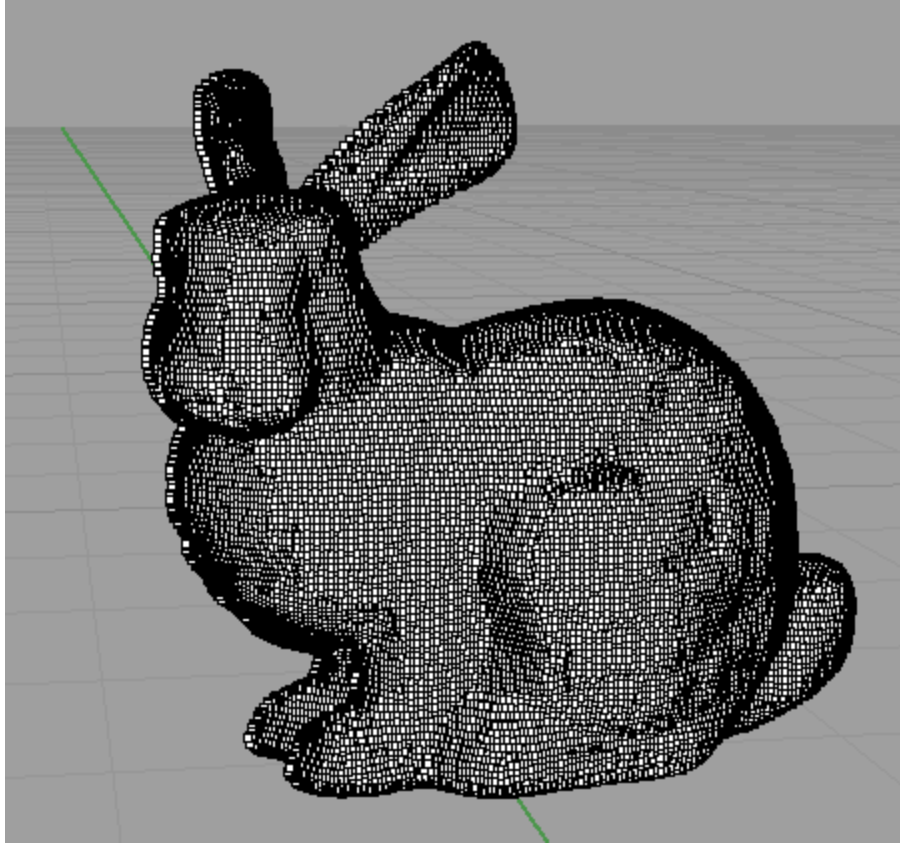


Step 4: Select the format and delimiters in the Point File dialog box and click *OK*.

Point Cloud for Rhino Help



Step 5: Zoom to the extents of the drawing (View->Zoom->Extents). You will find the points from *Wrap Mesh Sample 2.txt* imported into the current model.

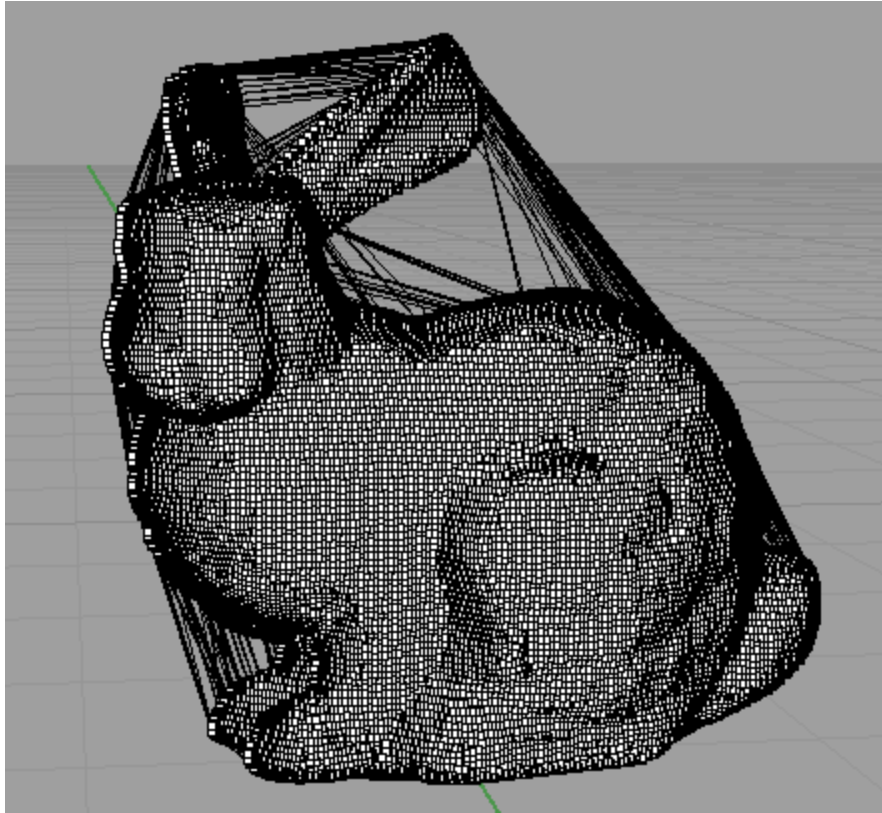


Step 6: Select *Wrap Mesh* from the *PointCloud* menu or type *PCWrapMesh* at the Rhino command prompt and press *Enter*.

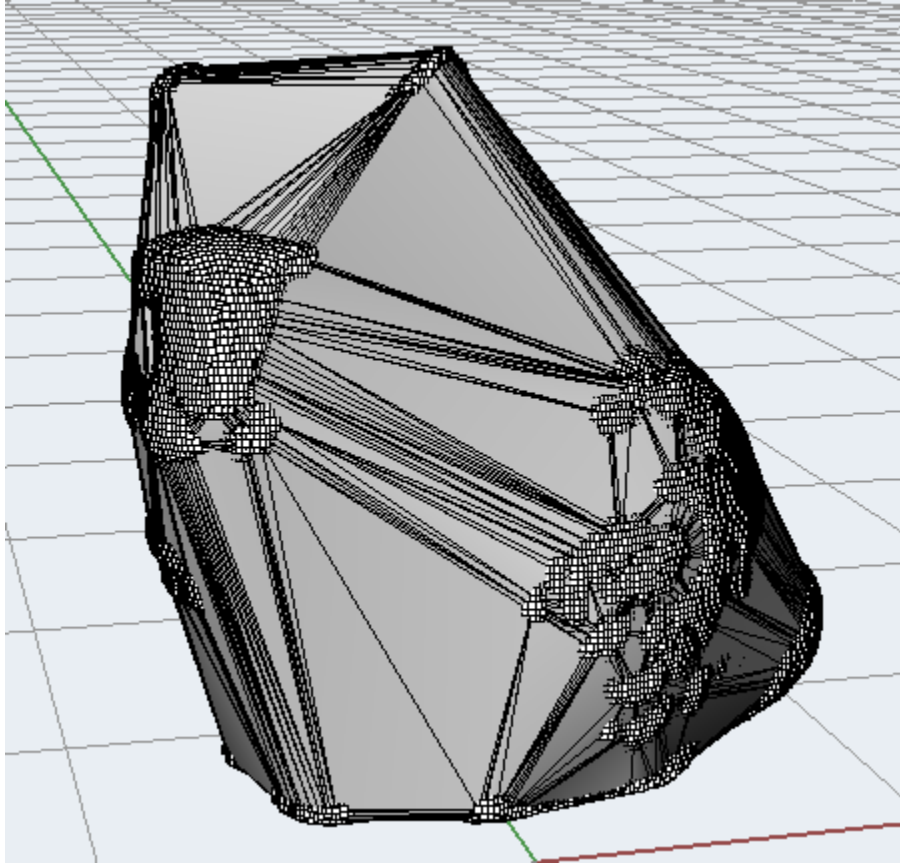
Step 7: At the **Select points** command prompt, set the *PointCloudType* to *Convex*, select the points and press *Enter*.

```
Select points ( PointCloudType=Concave ):PointCloudType
PointCloudType <Concave> ( _Concave Convex):
```

A convex mesh is created as shown below. As you can see the inner points which make the point cloud concave are ignored. This is not what we want.



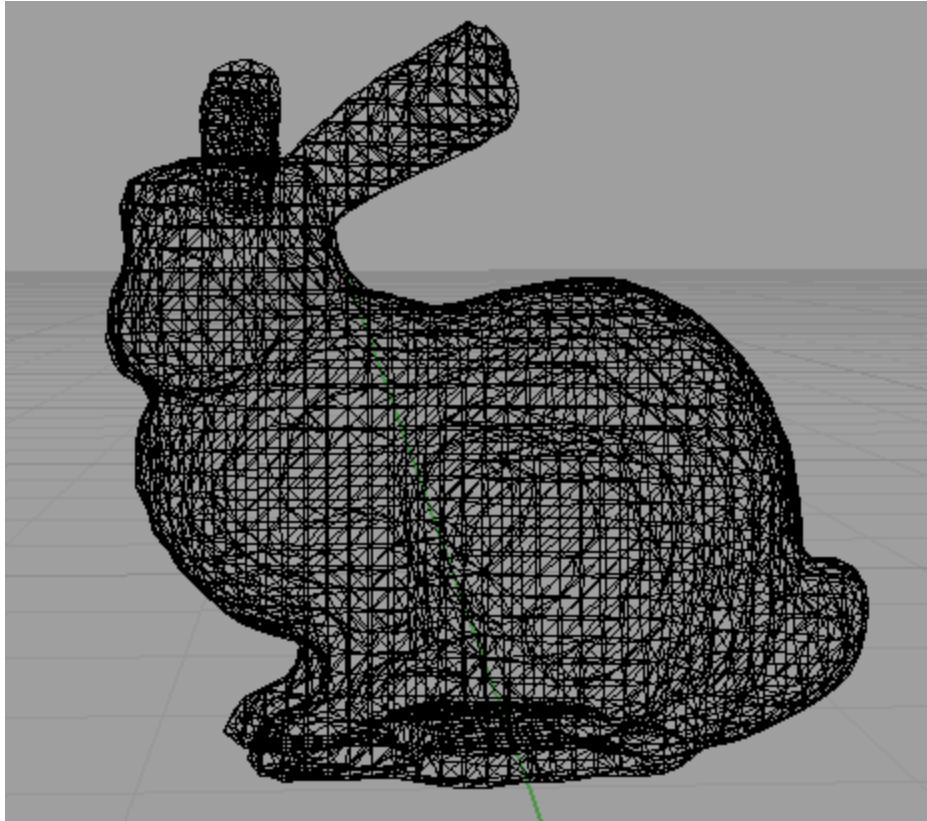
A convex mesh created ignoring the inner points



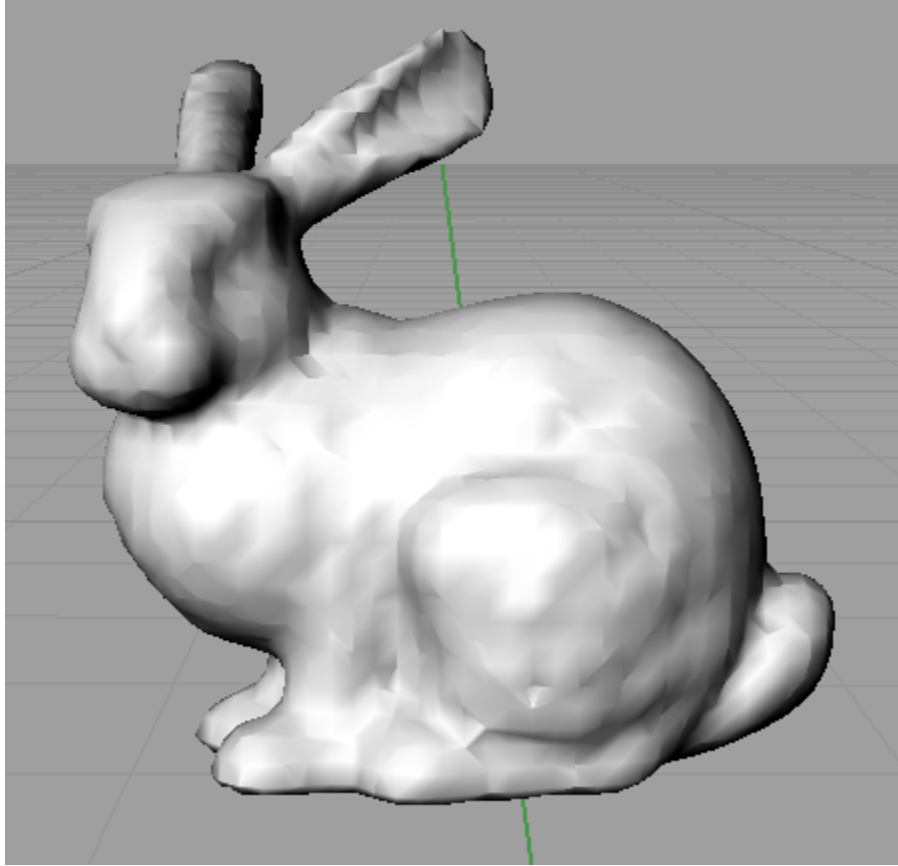
A shaded view of the mesh

Step 8: Delete the mesh and run the *PCWrapMesh* command again.

Step 9: At the **Select points** command prompt, set *PointCloudType* to *Concave*, select the points and press *Enter*. A concave mesh is created.



A concave mesh



A shaded view of the mesh

[Tutorial 3 - Wrap a mesh around a convex point cloud](#)

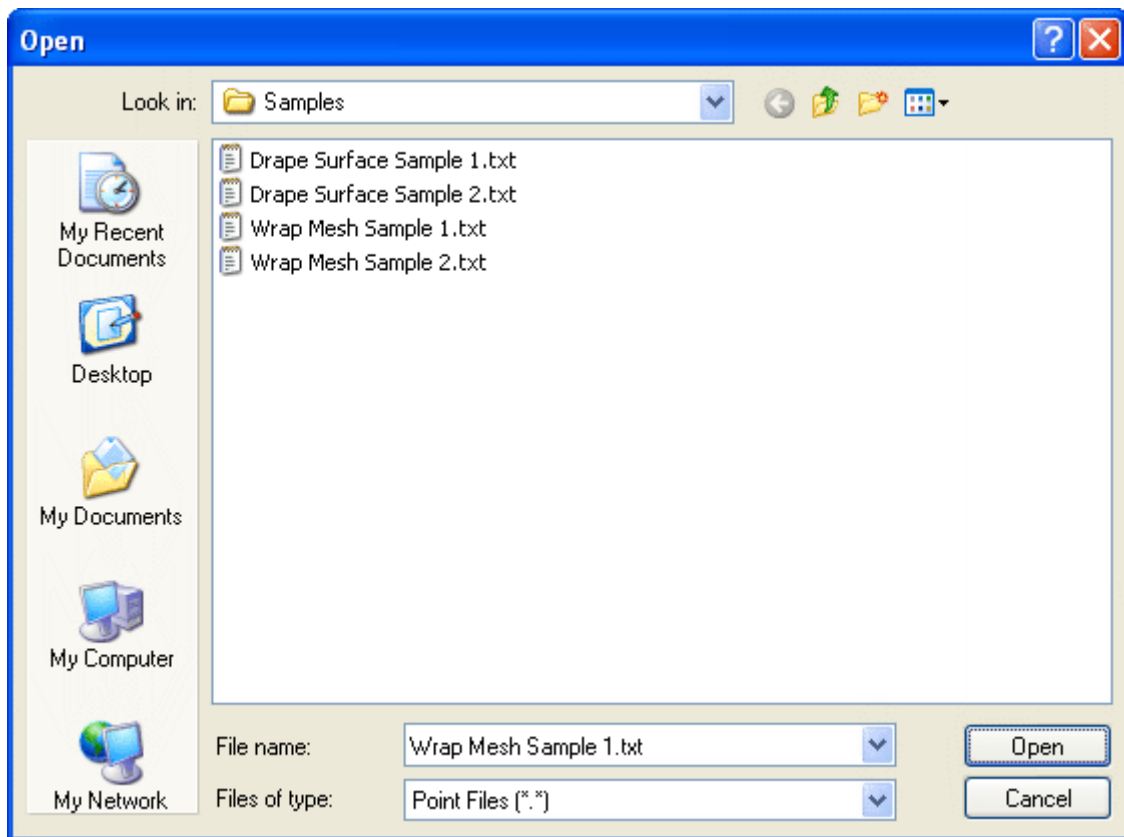
Tutorial 3 - Wrap a mesh around a convex point cloud

In this tutorial we will learn how a mesh is wrapped around a point cloud by setting a different options.

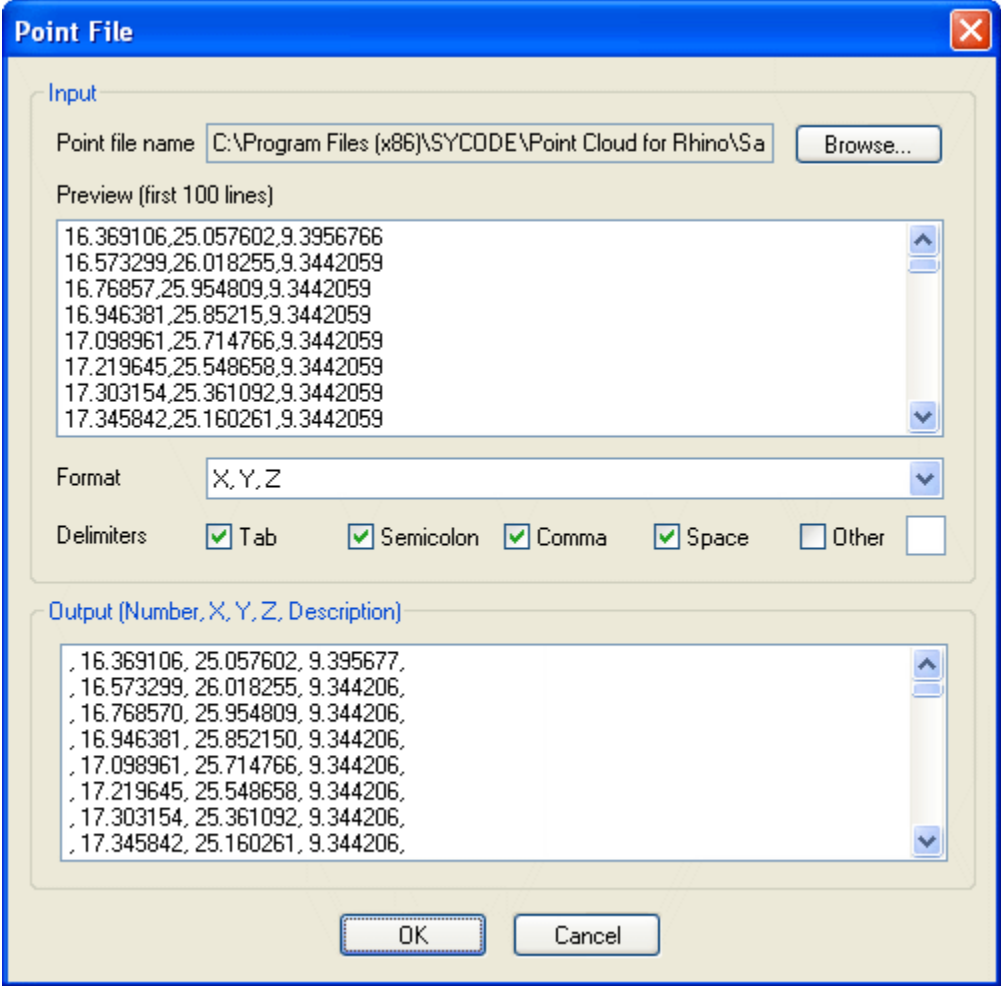
Step 1: Start Rhino.

Step 2: Select *Import Points* from the *PointCloud* menu or type *PCImportPoints* at the Rhino command prompt and press *Enter*.

Step 3: The *Point File* dialog box is displayed. Browse for the file *Wrap Mesh Sample 1.txt* (typically located in C:\Program Files\SYCODE\Point Cloud for Rhino\Samples\) and click *Open* from the *Open* dialog box.

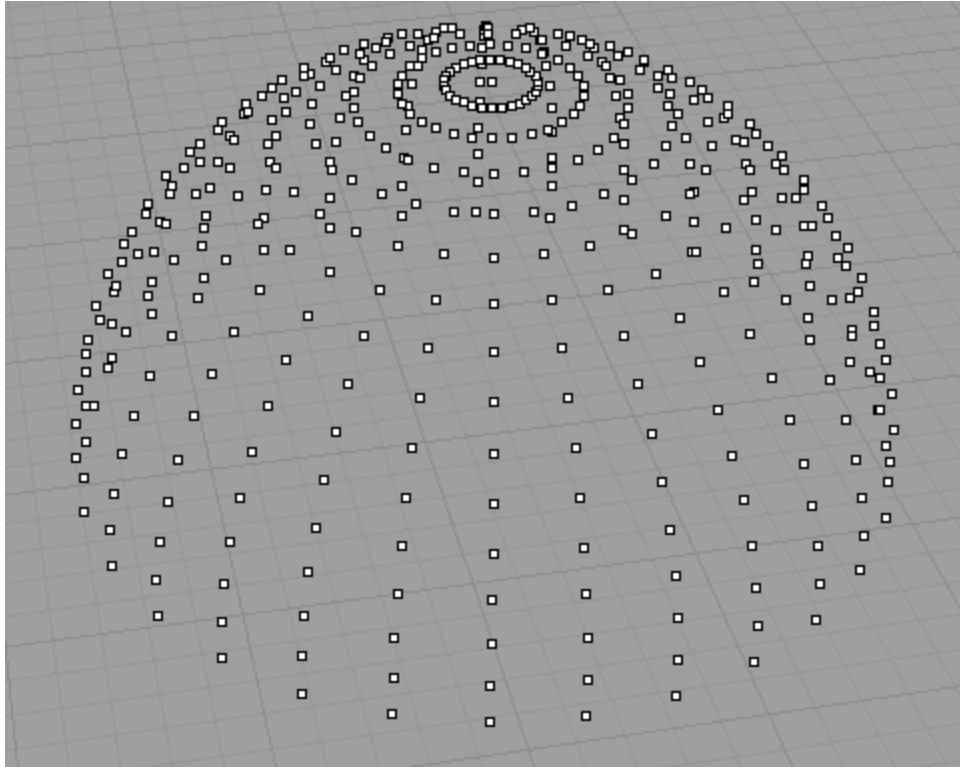


Step 4: Select the format and delimiters in the Point File dialog box and click *OK*.



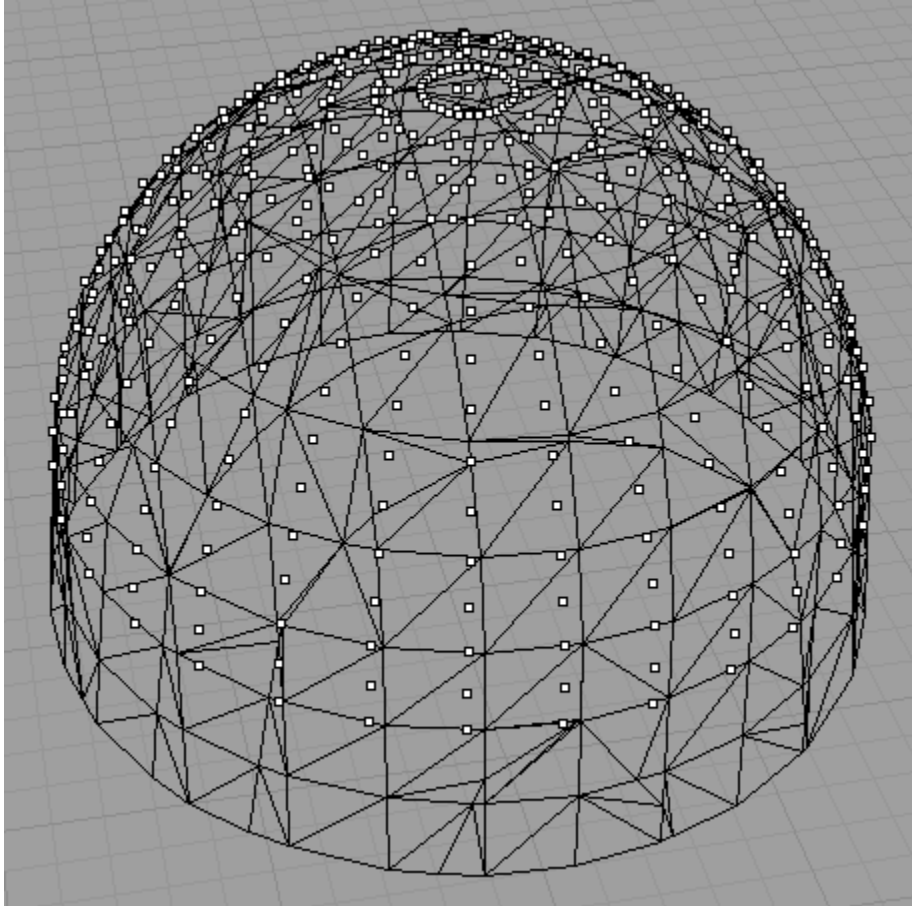
Step 5: Zoom to the extents of the drawing (View->Zoom->Extents). You will find the points from *Wrap Mesh Sample 1.txt* imported into the current model.

Point Cloud for Rhino Help

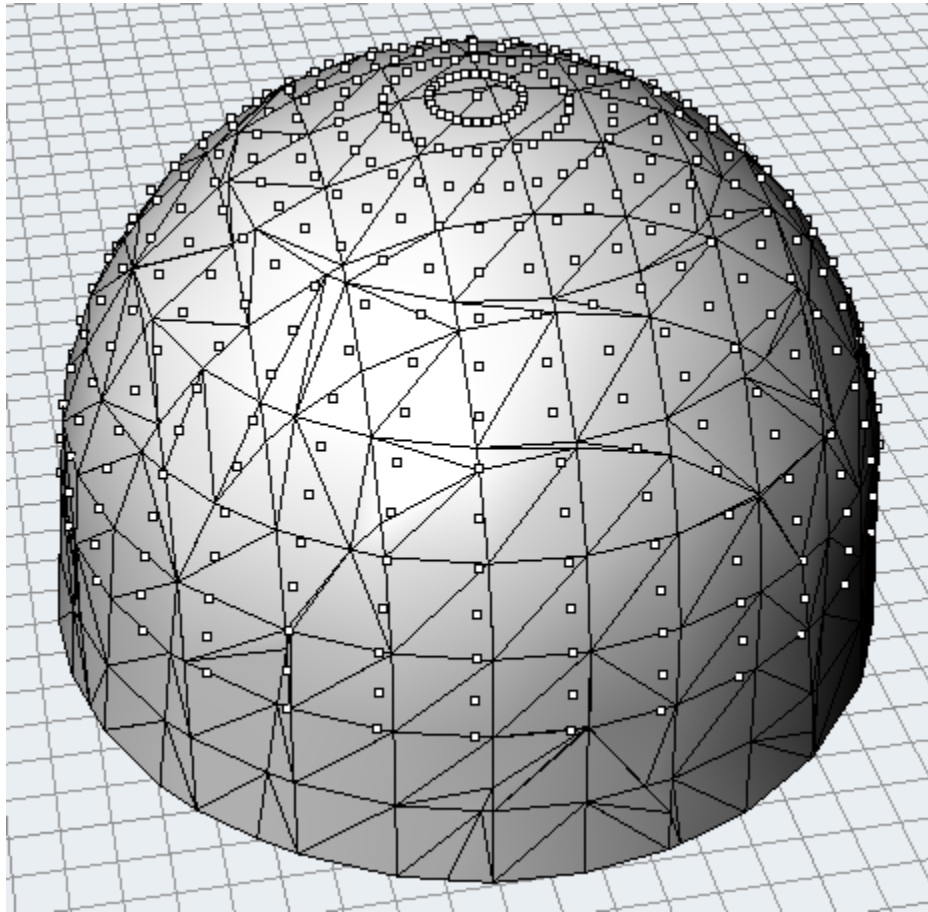


Step 6: Select *Wrap Mesh* from the *PointCloud* menu or type *PCWrapMesh* at the Rhino command prompt and press *Enter*.

Step 7: At the **Select points** command prompt, set *PointCloudType* to *Concave*, select the points and press *Enter*. A concave mesh is created as shown below. As you can see the mesh spills below the point cloud. This is not what we want.



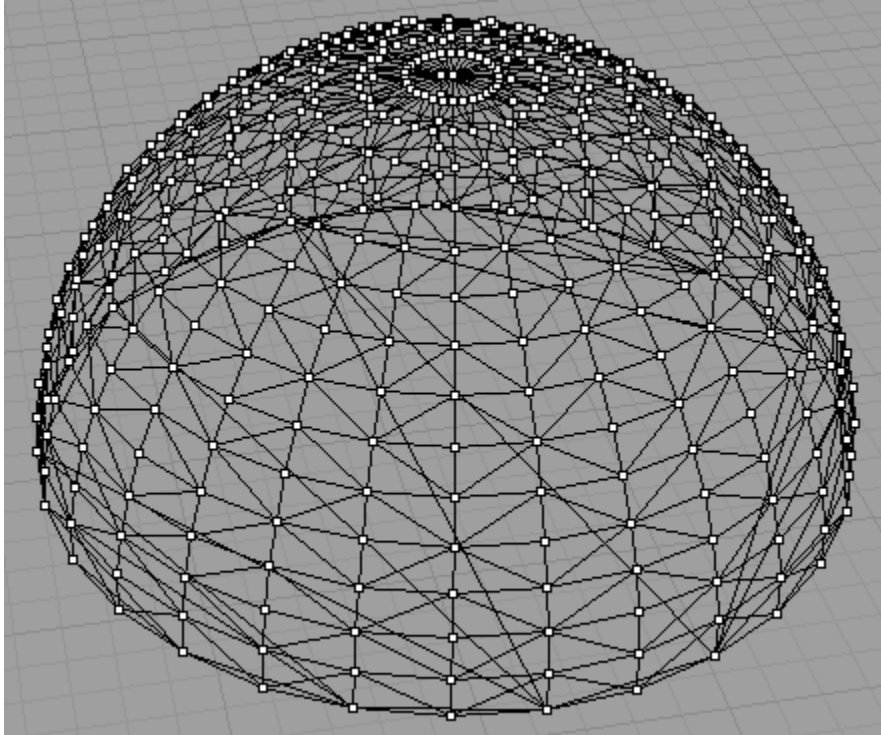
A concave mesh



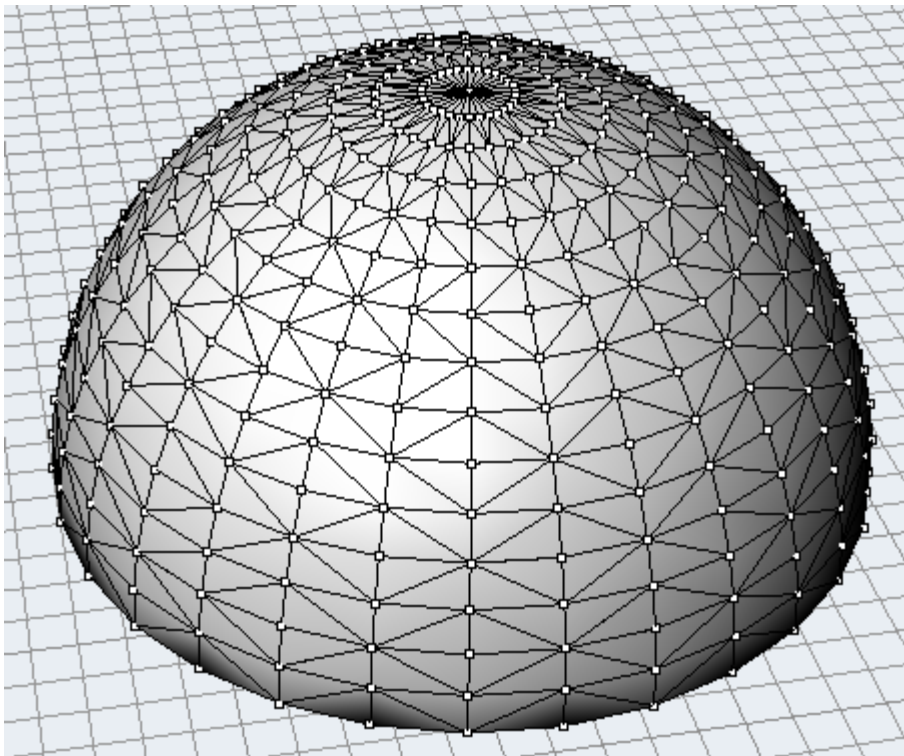
A shaded view of the mesh

Step 8: Delete the mesh and run the *PCWrapMesh* command again.

Step 9: At the **Select points** command prompt, set *PointCloudType* to *Convex*, select the points and press *Enter*. A convex mesh is created as shown below.



A convex mesh



A shaded view of the mesh