

MIKE Cloud Mesh Builder

Quick Start Guide



DHI A/S headquarters

Agern Allé 5
DK-2970 Hørsholm
Denmark

+45 4516 9200 Telephone
+45 4516 9333 Support

mike@dhigroup.com
www.mikepoweredbydhi.com

Company Registration No.: DK36466871

PLEASE NOTE

COPYRIGHT

This document refers to proprietary computer software, which is protected by copyright. All rights are reserved. Copying or other reproduction of this manual or the related programs is prohibited without prior written consent of DHI A/S (hereinafter referred to as "DHI"). For details please refer to your 'DHI Software Licence Agreement'.

CONTENTS

MIKE Cloud Mesh Builder Quick Start Guide

1	General information	1
2	Getting started.....	2
3	Uploading data	3
3.1	Creation of a project in Data Admin	3
3.2	Uploading files & restrictions.....	3
4	Using some of the new cloud features	5
4.1	Creation of a workspace in Mesh Builder	5
4.2	Creating a mesh.....	6
4.3	Interpolation.....	6
4.4	Density function.....	7
4.5	Extracting Open Street Maps data.....	8
5	Exporting a mesh	9

1 General information

It is required to have a user account in the Cloud with access to Data Admin and Mesh Builder access. If you don't have one yet, you can contact mikebydhi@dhigroup.com.

Google Chrome or Microsoft Edge and an active internet connection is needed to work with the MIKE Mesh Builder.

2 Getting started

Once you have received your credentials (see Default settings above), go to

<https://home.mike-cloud.com/> in Chrome or Edge.

Click on the button:



Enter your credentials and agree on the pop-ups.

You should be taken to the Cloud Homepage from where you can manage projects and see applications you can open. MIKE Data Admin and MIKE Mesh Builder should be visible from here. Please keep an eye on any notifications on this page as well, as they may indicate the Mesh Builder is unavailable at a certain time.

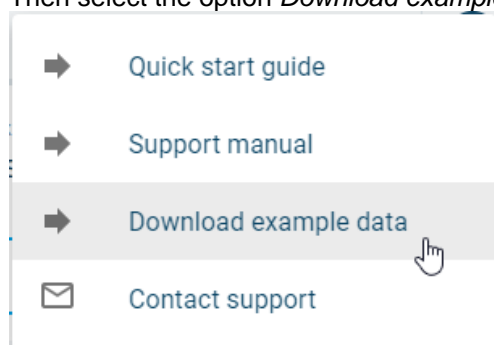
If you have difficulty opening this page, make sure you are using Google Chrome or Microsoft Edge and make sure your credentials are correct.

After that, there are two ways to get started: either you start by uploading your data (see chapter: *Uploading data*, next) or you can start from scratch using Open Street Maps data (data that is available from a free data source, see chapter: *Using some of the new cloud features*, paragraph: *Extracting Open Streets Maps data*).

If you would like to get a set of example data, it is possible to download this from the Mesh Builder by entering the Mesh Builder and then clicking this icon in the top right:



Then select the option *Download example data*:



This will give you a .zip file, which you will need to unzip and can then upload through the Data Admin (see chapter: *Uploading data*, next).

3 Uploading data

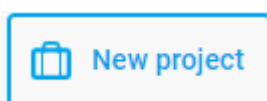
In order to upload some of your own data to the Cloud it needs to be entered through the MIKE Data Admin. Make sure the data you upload is not privileged or restricted for use if you want to use it in the MIKE Mesh Builder.

Click on the MIKE Data Admin button on the MIKE Cloud Home page and log in again if prompted.

You will enter the Data Admin and see all projects that are available to you (potentially none yet).

3.1 Creation of a project in Data Admin

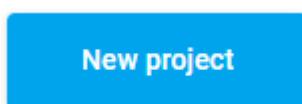
To create a project where you can put your files, click the button to the right:



A bar appears on the right.

Give your project a recognizable name (advice is to use your initials for example). You can fill in the other fields if desired.

Click on the button:



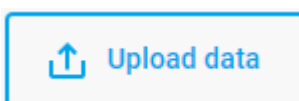
A message appears that your project has been created.

If it is not directly visible, use the Search projects bar at the top to type the first few letters.

Click on the line to open the project.

3.2 Uploading files & restrictions

Once you have created a project and gone into it, click the button:



A pop-up opens. Either click on the bar or drag and drop a file on it from your desktop.

TAKE NOTE:

- Only the following filetypes are supported for import: *.asc, *.shp, *.dfsu, *.dfs0, *.dfs1, *.dfs2, *.dfs3, and *.dfsu.
- It is currently only possible to upload **one file at a time** as you will need to detail which way the file needs to be handled.
- *.shp files need to be zipped with: *.dbf, *.prj and *.shx file into one *.zip file in order to be uploaded.

What you need to do next depends on the type of file you have selected to upload. It differs slightly, so we will cover it per type.

3.2.1 *.asc filetype

In the pop-up: Select: *Upload as-is*.

3.2.2 *.shp filetype

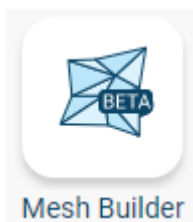
Remember to put the files into one .zip-file before uploading.

In the pop-up: Select: *Convert to different file format*, then under *Conversion options*, *Current file type* select: *Shape file (.zip)*, then under *Convert to* select: *GIS vector data*.

3.2.3 *.dfs(*) filetypes

In the pop-up: Select: *Convert to different file format*, then under *Conversion options*, *Current file type* select the relevant DFSU filetype and under *Convert to* select *VTK Unstructured Grid (.vtu)*.

After uploading all desired files, go back and click the Mesh Builder application:



Log in using your credentials if needed.

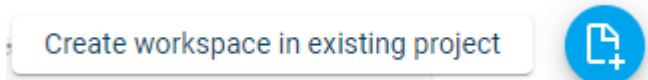
4 Using some of the new cloud features

4.1 Creation of a workspace in Mesh Builder

To create a workspace where you can use the files you uploaded in Data Admin, hover over the blue button to the right:



Two options will appear, select:



A bar to the right appears.

From the list of projects, select a project you have made in Data Admin.

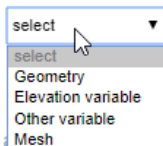
Under name, type the name of the workspace you want it to have in Mesh Builder.

Under 'Data from project', tick the boxes for the data from the project you want to use in this workspace, then select what the data is if it hasn't been automatically determined:

Data from project

<input type="checkbox"/>	RB_densityfunction_4m_2	select
<input type="checkbox"/>	RB_Buildings_Poly	Geometry
<input type="checkbox"/>	RB_DOI	Geometry
<input type="checkbox"/>	RB_Extent_Poly	Geometry
<input type="checkbox"/>	RB_dem_4m_2	select
<input type="checkbox"/>	RB_crs_road_prj	select

Select the data to add to the workspace



When you are done (or you don't want to start with any data from a project), click:



The workspace is created with the provided data set.

The interface should help you find what you need, but some features, like selection tools and zooming, might be using special keyboard shortcuts. There is an icon to the top right of the screen where the keyboard shortcuts are described:



There is also a manual with more explicit descriptions, which can be found under the icon:



Then choose option Support Manual. Please be aware some of the information here may currently be out of date.

4.2 Creating a mesh

After the creation of the workspace with the dataset, click:

New Mesh

Select all Geometries and Variables you want to use in the Mesh by putting a tick in the box in front of it:

Then click:

Configure

You can apply some general mesh settings, such as the minimum angle and the CFL limit, but also make configurations to individual objects (changing from triangulation to quadrangulation or the edge lengths for that specific object for example).

 Polygon 1 

Mesh operation
Triangulate (Triangle) ▼

Max edge length
0

Border edge length
0

Use background density function 

Click the button to generate your mesh:

Generate

4.3 Interpolation

Once you have a mesh and there are relevant Variables defined as Elevation variables when the workspace was created, these can be used for interpolation.

Go into the mesh by clicking it, then go to the tab **Interpolate**,

Add interpolation

Click **Add interpolation**.
Select *Interpolate elevation* from the dropdown.

Tick the box in front of the file that needs to be used for interpolation, then click:

Next

Finally, click:

Interpolate

The interpolation will now be applied to the mesh. Two ways to view the results is by clicking **Elevation** in the mesh analysis, which will colour the mesh or go to the 3D view.

4.4 Density function

One major difficulty frequently encountered in unstructured meshing is the ability to control the variations in mesh density (i.e., the spatial variations in elemental sizes) over the entire domain.

The MIKE Cloud Mesh Builder makes it possible through the Density function to generate a mesh so that the generated triangles are optimised based on a variable, for example bathymetry.

To use it, the workspace needs to have a variable to base the density on:

RB_dem_4m_2 Elevation variable ▼

After you have added this to the workspace, click:

New Mesh

Select all Geometries and Variables you want to use in the Mesh.

Click:

Configure

Select the option to use the background density function and define which variable should be used to optimise from. Select 'Apply gradient' if you want gradients applied:

Use background density function ⓘ

Number of points

10000

Use without a variable ▼

Use without a variable

RB_dem_4m_2

Apply gradient ⓘ

Click:

Generate

A new mesh will be generated, optimised using the density function.

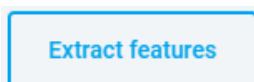
4.5 Extracting Open Street Maps data

For this feature, it is not needed to start with existing data, but it is needed to have a project in Data Admin where your data can be stored, so make sure you create one first (see chapter Creation of a project in MIKE Data Admin).

It is also needed to have a Workspace in MIKE Cloud Mesh Builder, as described in the first part of this chapter.

Zoom in to the area that you want to extract data from (using mouse wheel).

There is a button on the right that says:



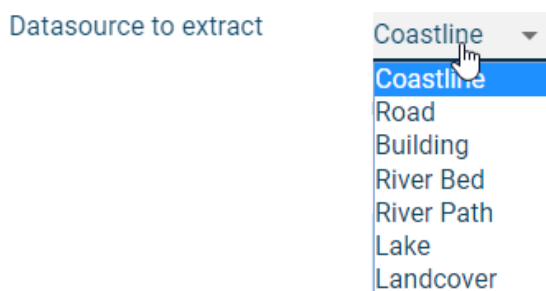
(You can reach the same feature by using the little icon on the left: )

This will enable you to draw a figure on the map, clicking once with the left mouse button to start and then clicking once every time to draw another point on figure.

Double click with the left mouse button to close the figure.

The area you select in this way defines where the data from Open Street Maps will be extracted.

Also, options appear on the right, asking you what you want to extract. Pick the option from the dropdown with the data type that you want to get:



Click:



The data that was available and extracted, is shown on the map to the left.

It is possible to apply operations on this, using the options on the right:




Once it is to your liking, click:




This will create the extracted data as geometries on the right, which you can now use in your meshing (see: Creating a mesh).


5 Exporting a mesh

At this moment, the MIKE Mesh Builder enables you to export *.mesh and *.vtu files from created objects. These can be downloaded from the Data Admin platform once created.

Go to the right side of the screen and click .

Select the mesh to be exported by putting a tick in the box in front of it: 

Choose the desired format from the dropdown:

Export as .mesh 

Export as .vtu

Export as .mesh

Click:



The export is generated in the MIKE Data Admin, so to find it click:

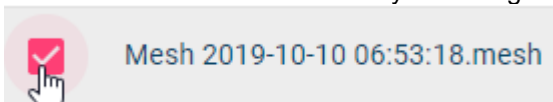


Login if required.

Search your project.

Click on the name to open the project.

Tick the box in front of the mesh you have generated and want to download:



Click:



A file will start downloading to your default download directory and be done after a few moments.