
Real terrain maker is an easy tool for creating terrain with the real geographic data.
Specifies the geographic coordinates, and make a terrain of anywhere on the earth in a few clicks.
This plug-in runs depending on the Google/Bing map service, which requires Elevations API and Static map API keys.

# Features:

## Picture downloads:

Image saved in a folder for each time the generate starts.

## Map Style:

Besides satellite, three more types of terrain texture supported. It is convenient for making a 3D map.

## Real Elevation data:

Using the elevation data of Google map, over 30 meters in most of the Earth areas.

## Easy setting:

To make a terrain faster or in high quality, simulate the real world or make an extravagant land. All setting can be made in a few clicks.

## Save in many types:

The data downloaded can be saved in mesh, terrain, and prefab. Material is created automaticity.

Adjustments saving:

Can save keys and other settings for the other time.

## Preset template:

Include some common options for fast data preview or high details terrain creating.

# New Features of Version 2.0

## New Data Source Supported:

You can use the Bing map data to generate a terrain in the new version. The map service may have some problem , such as lack of data in certain area. Try another datasource if one is not so satisfactory.

## Random Map:

One selectable option to generate a random map is provided. It can be used to save time when doing test or just make an infinite random terrain in a game.

## Run Time Infinite Map:

Download the map texture and elevation data automaticity while running the game.

## Style Setting:

You can generate a terrain of low-poly style and set a default material before generating them. You can also set the default layer for the use of infinite map.

## Combine and Save:

You can combine and save the generated mesh to prefab and terrain at any time.

## Basic Materials for Terrain Provided:

Several materials such as contour ,grid , gradient and multiple texture height shader . It's possible to add some snow at the top of mountains and lava in the valley

# Improvement

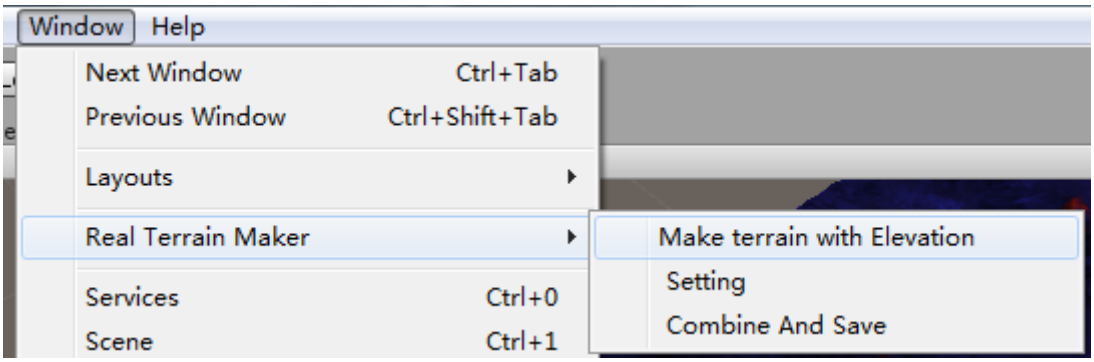
upgrade the autozoom function ,and support bigger texture download.
Change the sampling method of geographic coordinates while generating terrain.

**To free users, Google does limit the number of elevation samples and limit the times of requirements in one day. Try to work within this limitation or upgrade the API key.**

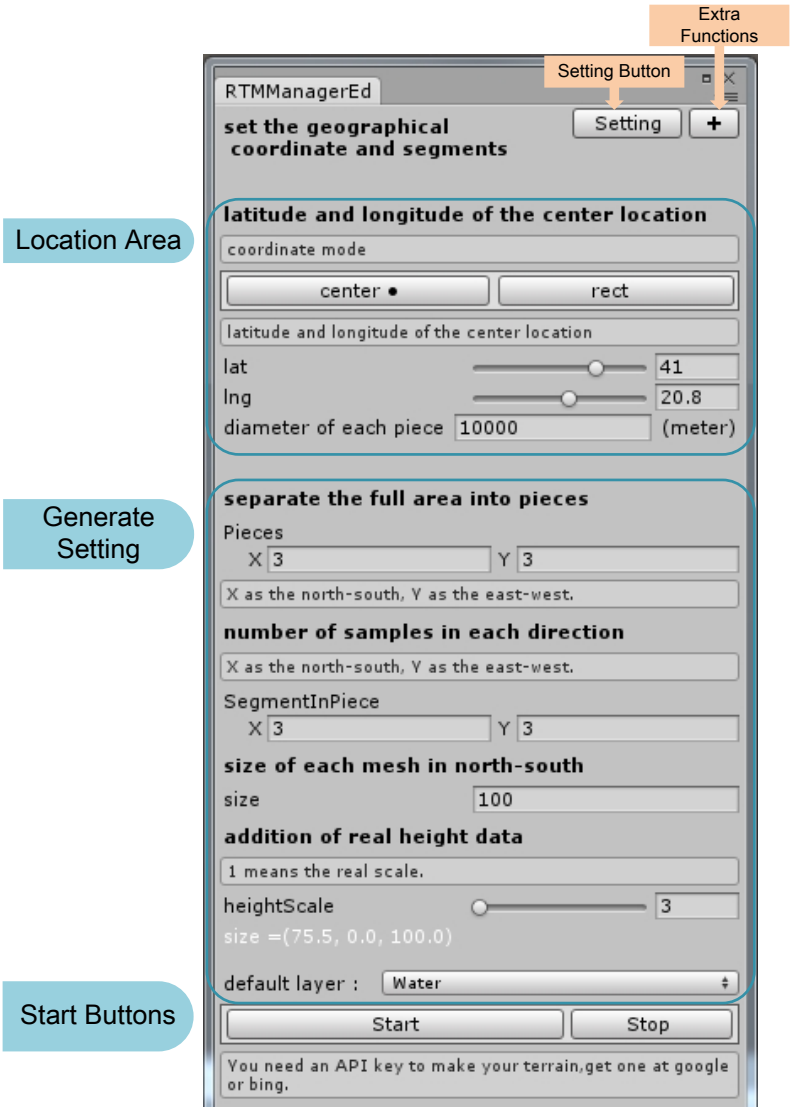
# Guide:

## five steps to make a real world terrain

### Step 1:




Open or create a new scene and find ***Real Terrain Maker*** on your top menu bar. The editor window will show up.

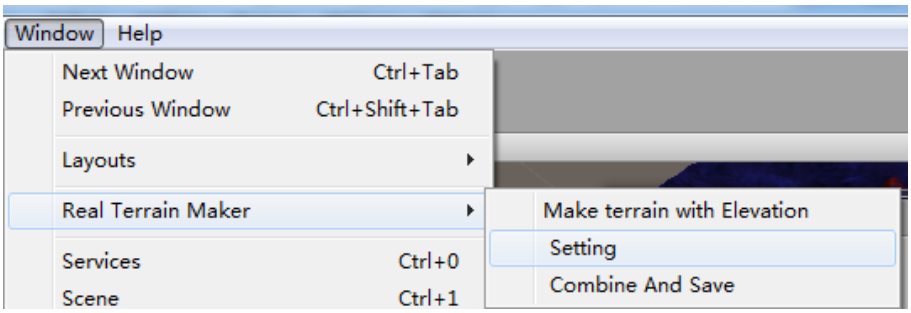


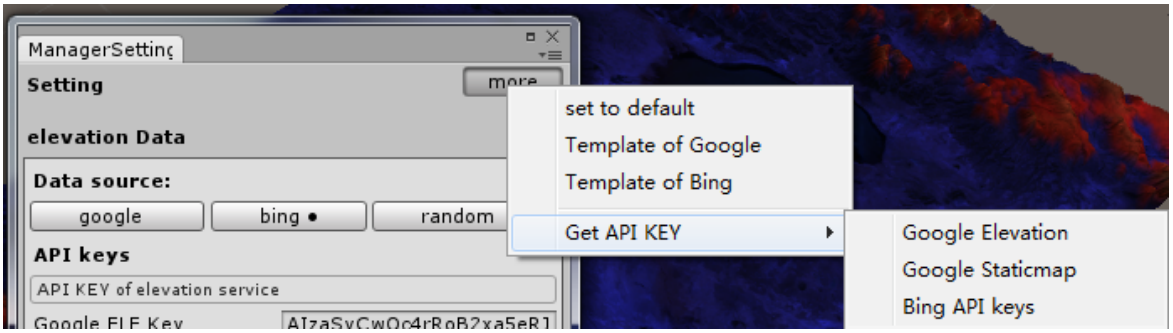
## Step 2:

Get and fill up your API key.

The API key is required if you want to use the Google or Bing map service. Log in your **Google/Bing account** and enable the API.

Open the window on your top menu bar or click the setting button.



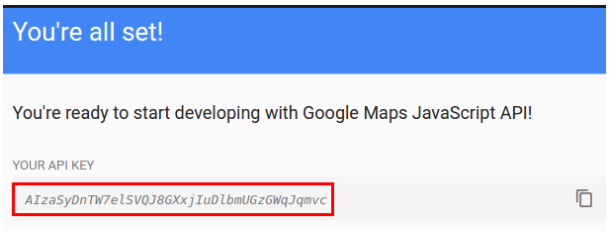



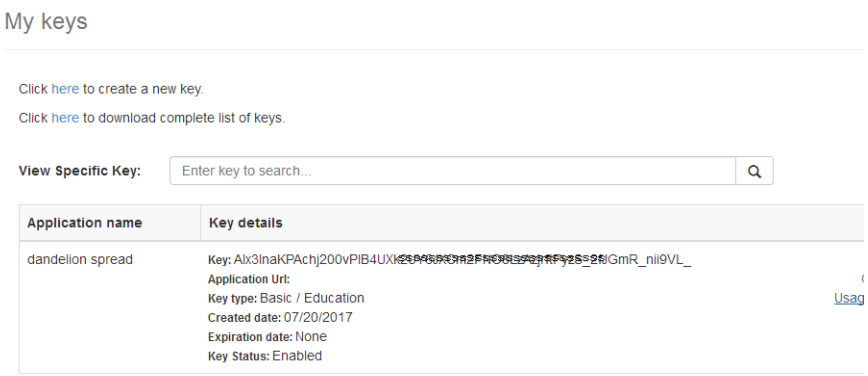

Open the pages through more button. or enable the key at:

https://developers.google.com/maps/documentation/elevation/start

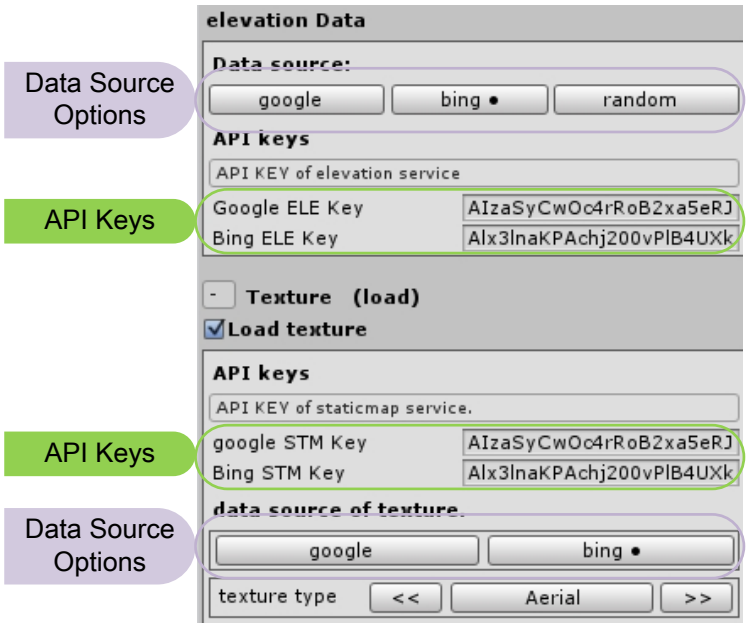
https://developers.google.com/maps/documentation/static-maps/

https://www.bingmapsportal.com/




paste your own key to the right fields. It will download the data from the data source you selected.




You can change the **data source option** and **API keys** at anytime , click ***save*** or ***apply*** to confirm the changes.

## Step 3:

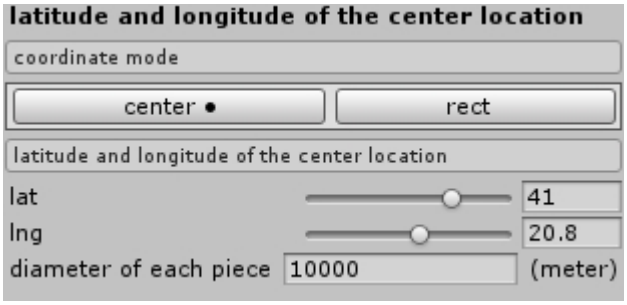
There are two modes to settle the real world location to generate a terrain.

## Center mode:

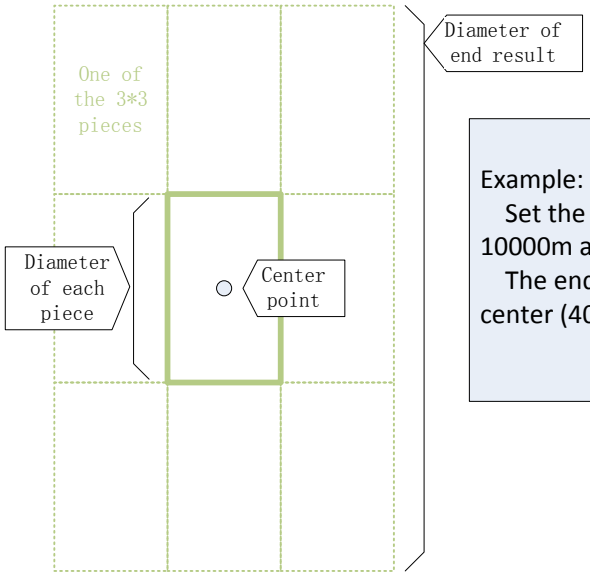
Determine the target area with a center point and a distance of diameter.

1.Find the latitude and longitude of the target location with Google Map, and measures the distance.


2.Fill the geographic coordinates in the lat/lng field, and the distance you measured is the diameter of **each piece**.




※If you set the pieces more than one in Generate Settings, the end result will be many times of the area you determined.

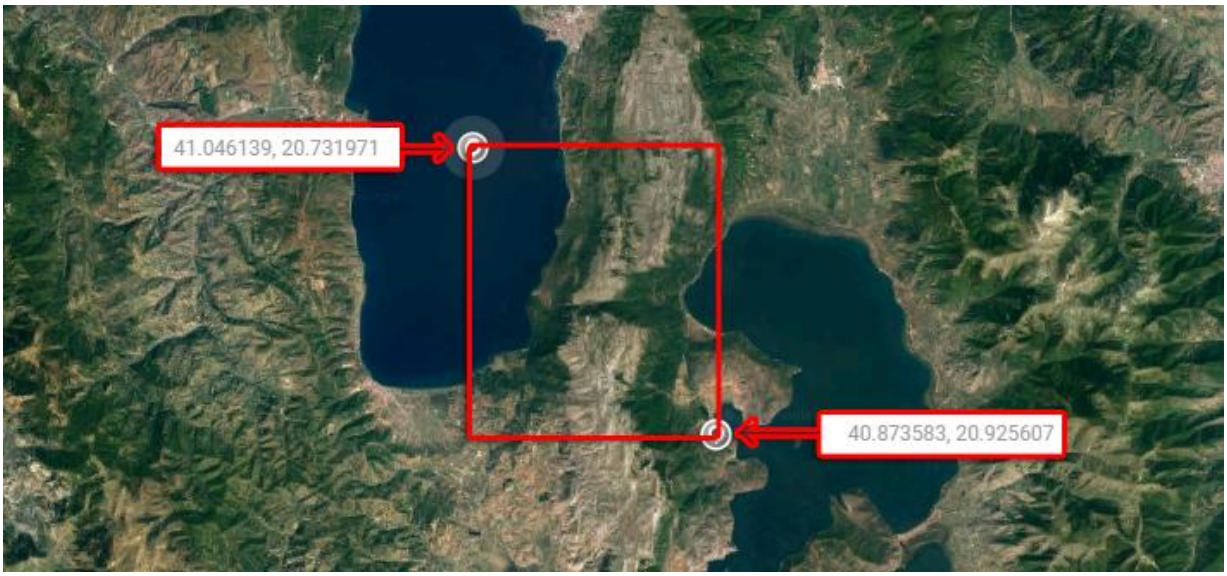



Example:
Set the center point (40,20), diameter 10000m and pieces 3*3,
The end result will be the area with the center (40,20) and diameter 30000m.

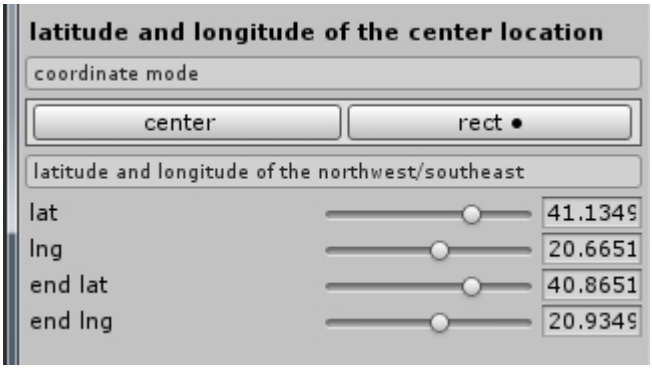
## Rect Mode:

Determine the target area by two points. Using the latitude and longitude of northwest /southeast location.

1. Find the latitude and longitude of northwest and southeast point.

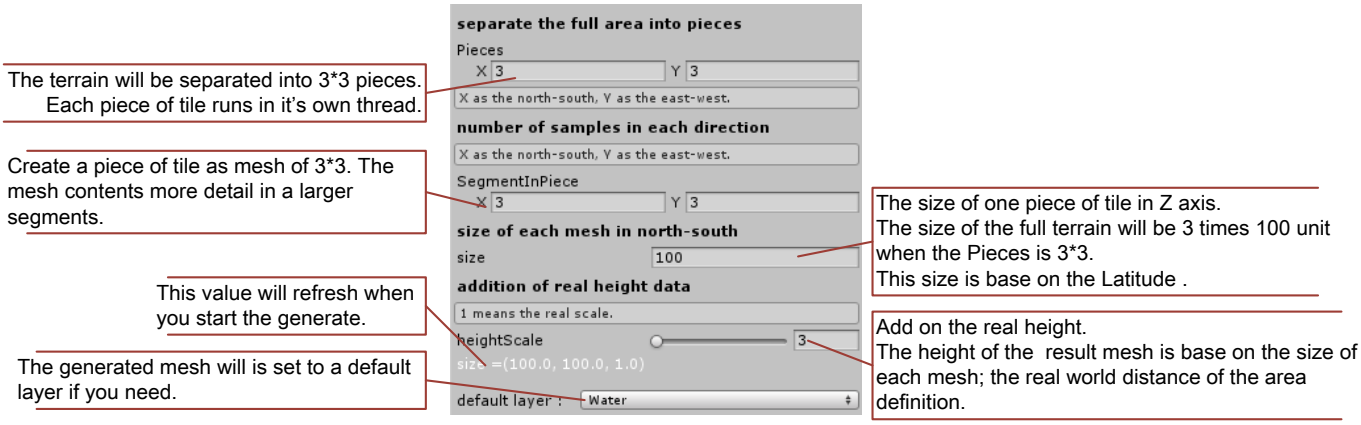



2.Fill the geographic coordinates in the lat/lng field.




## Step 4:

Set the ***Pieces*** and ***Segments*** of your generated terrain.



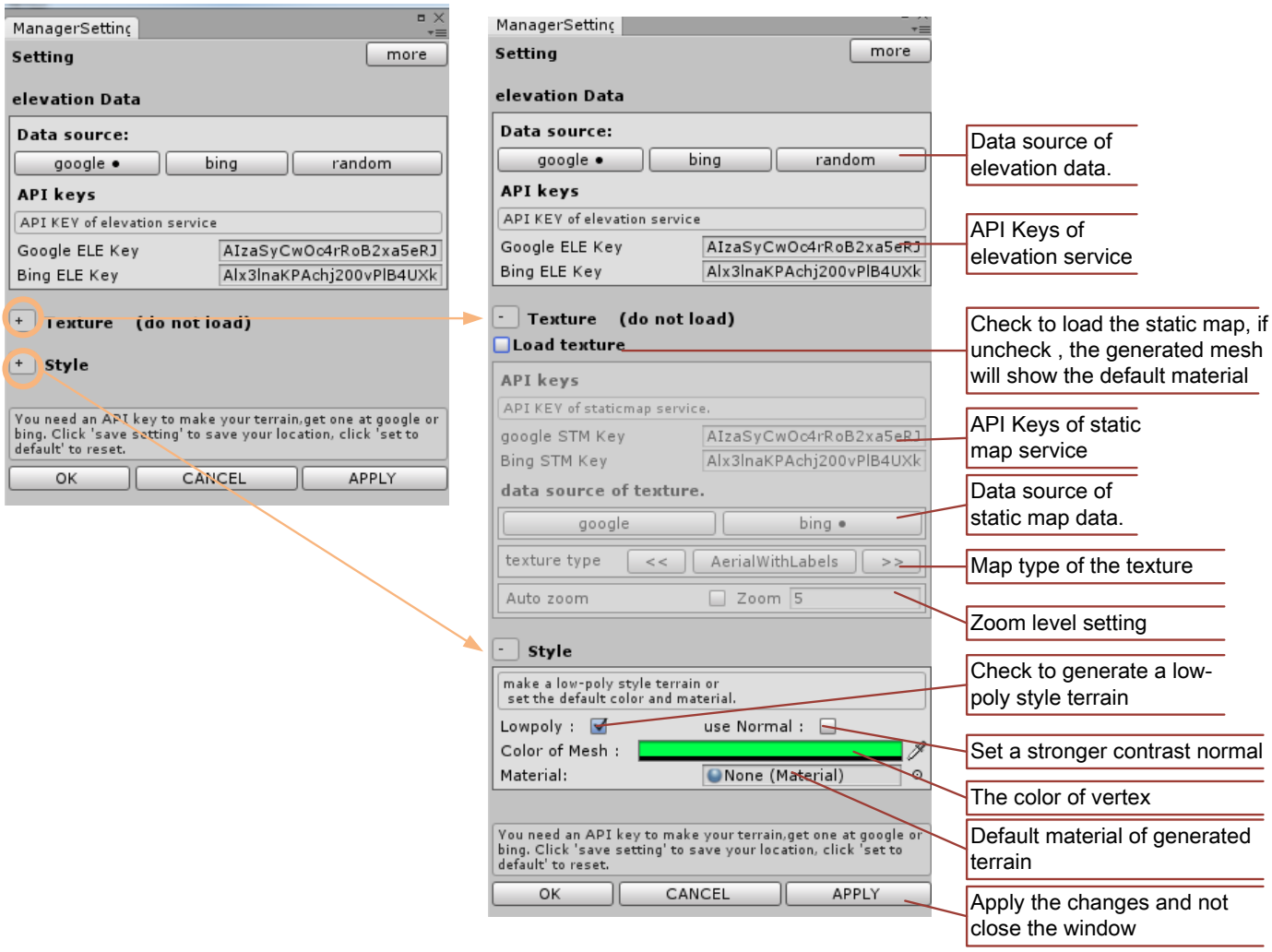

## Step 5:

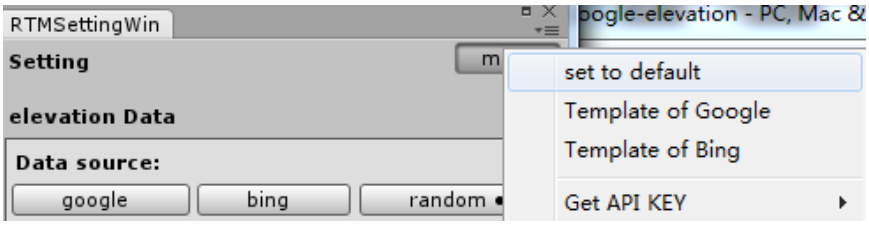
Now click the ***Start*** button and wait for the download. The time it takes depends on the size of texture and the pieces and segments you set.

## Advanced Using

## Advanced Setting:

The setting window can be open by click setting button or through the top menu bar.
The texture setting and style setting are folded, click **[+]** to expand them.



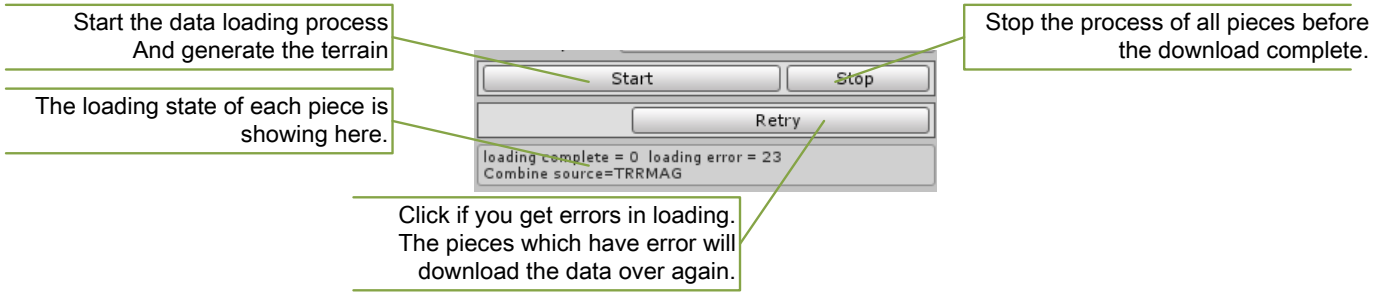




Use the ***template of Google/Bing*** , the elevation an texture setting will set to a common value of the selected data source.

Use the template value if you are not sure which value is able to use.

Click ***set to default*** to clear all your settings ,including your API keys.

## Stop and Retry:

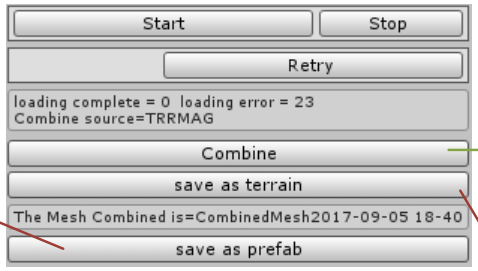



After start loading, you can stop the loading process immediately by clicking the ***Stop*** button.

The loading state of each piece is showing down the start button.

If You Get some errors in loading, such as network problem, API key out of limitation, fix the problem and click ***Retry*** to reload the error pieces.

## Combine and Save:




Save the combined mesh as prefab .

contents material and mesh.
All the saved files in the Resources/system data directory.

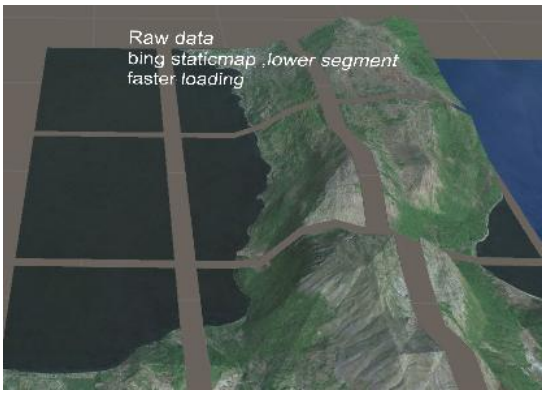
Combine the pieces of mesh to an all-in-one mesh and combine the texture.

Save the pieces of mesh as unity terrain file and combine the texture.

The mesh of terrain generated after the data loading.

They are formed as raw data in the scene, separated in pieces if the ***pieces*** of ***generate setting*** is more than one.

*You can see the differences of raw data and combined mesh in the example scene* ***534-GalicicaNational****.*




It takes more space to store the raw data, save them as prefab or unity terrain to keep the size of the scene file.

After the data loading , click ***combine*** to combine the pieces into a new Gameobject. The texture will be combined to a full picture file. The combined file retains the vertices texture and normal data.

※The combine and save as terrain operations run with the default setting, use the ***combine and save window*** to see more options.

The combine operation process for a bit of time ,it depends on the number of elevation data and the size of texture file.

After the combine operation, the combined mesh can be saved as a prefab.

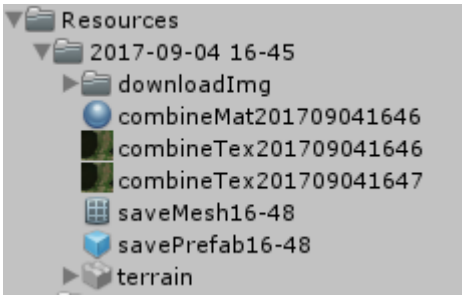
If you have not created the terrain completely in one time, you may receive some warning when you combine the meshes. You can go on combine them if you are satisfied with the result data.

※if the total number of vertices is greater than 65535, the mesh CANNOT be combined. It can be saved as ***terrain*** only.

Click ***save as terrain*** to save the raw data to a unity terrain file. The terrain file retains the texture and more smooth than the mesh terrain. The process of texture combine also takes time, please wait patiently.

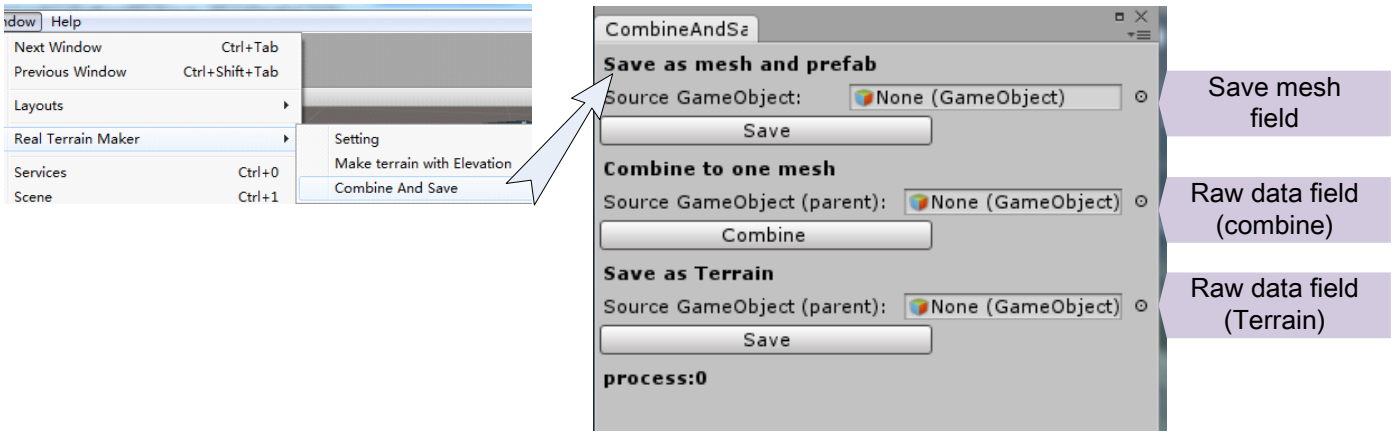
*See the differences between unity terrain and combined mesh in the example scene* ***Olympic National Park.***

All the saved files in the Resources/system data directory.



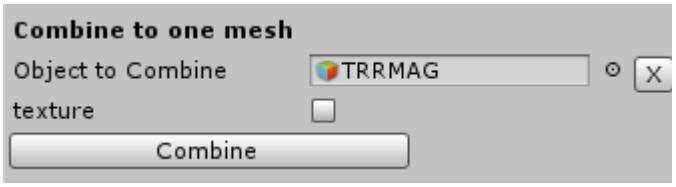
## Combine and Save Window:

if you open an existing scene and want to combine the pre loaded raw data, open the Combine and Save window through top menu bar.

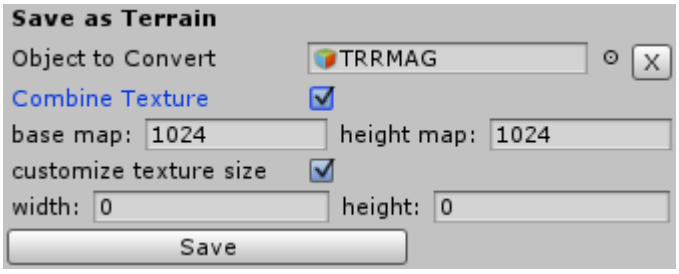




Drag or select the combined Gameobject to the ***source object field*** and click save, it will save as a prefab, including the mesh and texture. You can use **[x]** button to clear the field.

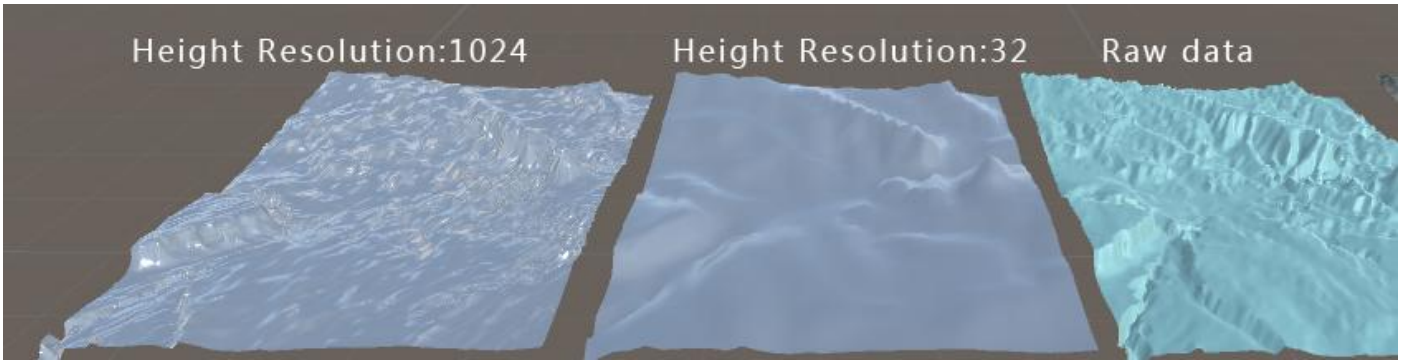



Drag or select the raw data Gameobject to the source object field (must be the parent object), check the ***texture*** box and the texture will be combined. If the texture box is unchecked, it will only combine the mesh.




while saving terrain ,you can also check or uncheck the ***texture*** box.

The ***base map*** and **height map** stand the **baseMapResolution** and **heightMapResolution** of the terrain data.



check the ***customize texture size*** box, two options of ***width*** and ***height*** will show up. If they are set to zero, the texture file will use the maximum size of the downloaded texture.

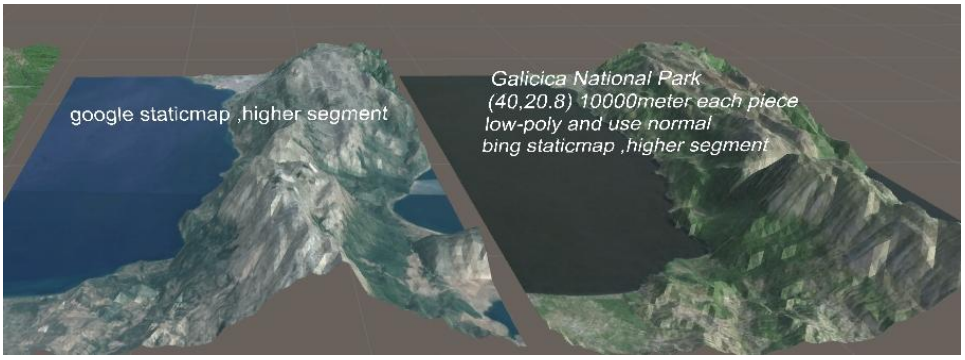
※the texture file of a combined mesh and terrain is not same. The texture of combined mesh follows the Mercator projection ,it retains most data of the downloaded files.

## Data Source:

In the 2.0 version of RTM, you can use Google and Bing map service as the source of data.

1. The elevation and imagine of static maps have some difference in the two sources.

*You can see the differences of static maps in the example scene 534-GalicicaNational.*

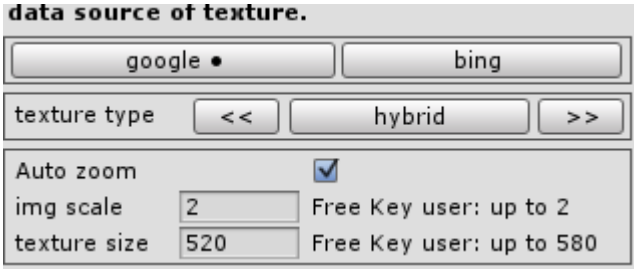



2. The time the download processes take could be different with the two data source. It depends on your network condition.

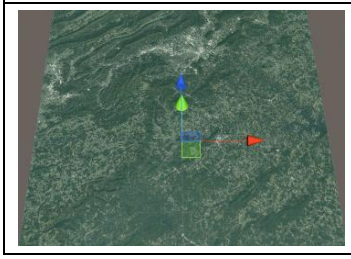
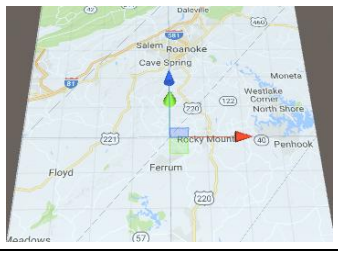
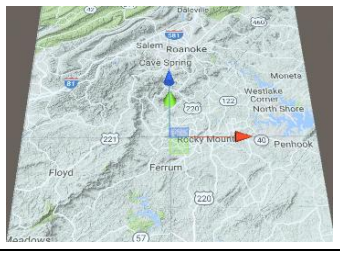
3. Google and Bing map services have some limitations for their API users.

*read* https://msdn.microsoft.com/en-us/library/ff701724.aspx *and* https://developers.google.com/maps/pricing-and-plans/ *for more details.*

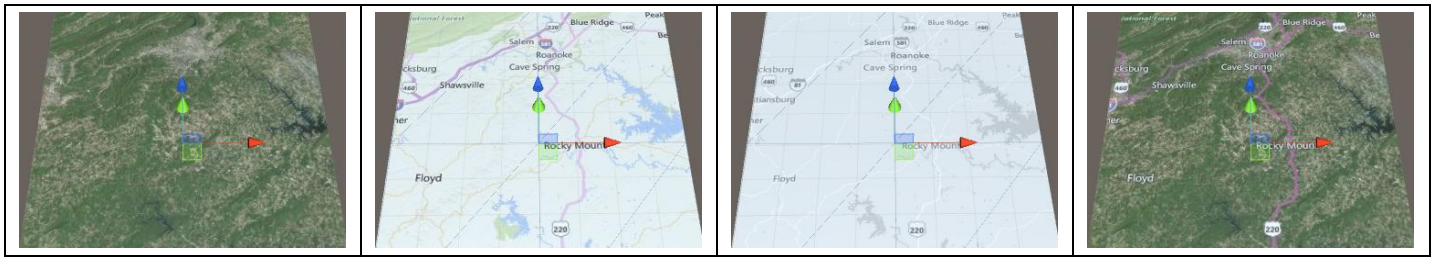
## Texture Types:




Four types of texture provided.

| Google Map Types | | | |
|---|---|---|---|
| satellite | roadmap | terrain | hybrid |
|  |  |  |  |

| Binge Map Types | | | |
|---|---|---|---|
| Aerial | Road | CanvasGray | AerialWithLabels |



## Texture Size:

You can choose AutoZoom or set the zoom level by yourself.

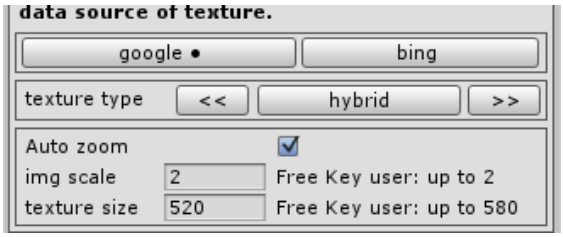
*read more about zoom level:*

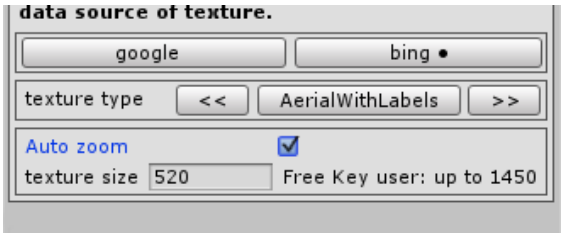
*https://msdn.microsoft.com/en-us/library/ff701724.aspx*

*https://developers.google.com/maps/documentation/static-maps/intro#Zoomlevels*

When the ***Auto Zoom*** is checked , the zoom level will be the maximum according to the reference ***texture size***.

There are some different selections when you use Google or Bing services.




Google provides a larger imagine scale while loading a texture file.

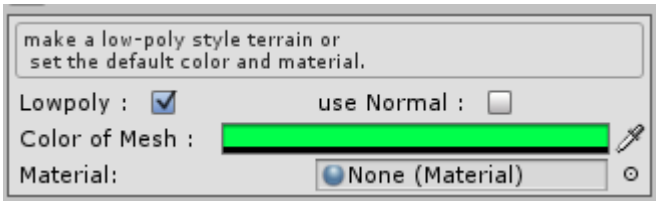
Notice that there are limits for both free user and upgrade users, if the texture size, zoom level or image scale exceeds the limits, the imagine downloaded might be wrong, or the download may get errors.

When the Autozoom is unchecked, you can set the zoom level by yourself.


The zoom level is an integer between 0 and 21.

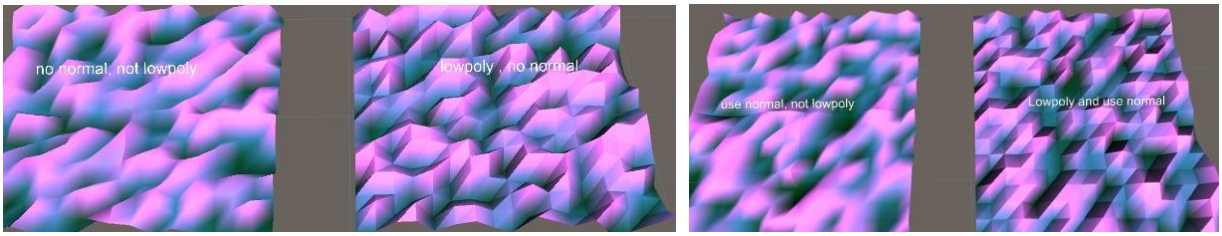
Some image may not be available at all zoom levels for all locations. If it is not available at a location, the download may get errors.

## Styles:



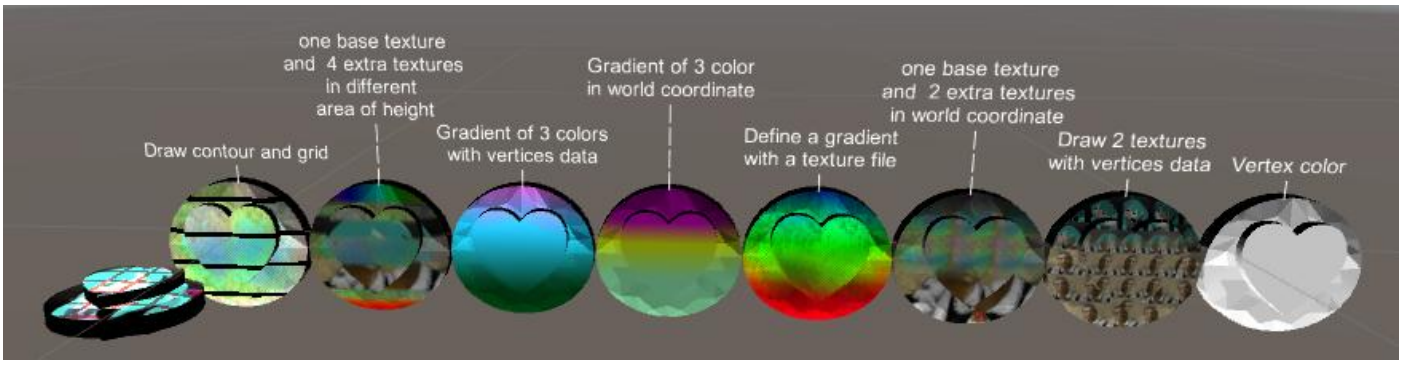

Before start generation, you can set a default style of the terrain.

*see the differences of static maps in the example scene* ***500DifferenceInStyles***.




※The ***Lowpoly*** style will make the number of vertices 6 times of the mesh which is not lowpoly style. It will NOT cost more time to download data .

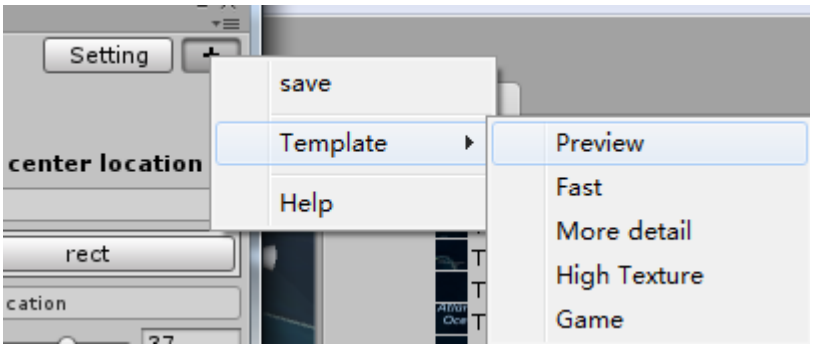
Drag a material file to the ***Material*** field will set the default material of the terrain. There are many basic materials for terrain provided, You can drag one when you prefer not to load the static map as a texture.
*check out how the basic material looks in the example scene **BasicTerrainMaterial**.*




When using the Vertex Color material, the terrain will show the color you set in the Color of Mesh field.

## Preview and Template:

It's usually needed to have a quick load to see whether the certain area can be generated correctly. click **[+]** , and select a ***template***, the piece and segment will be set to a lower value to save time. There also provide many templates of some common setting.

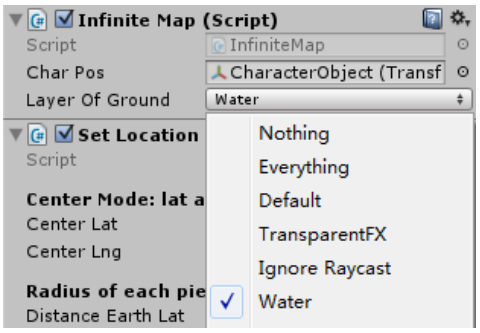



## Run Time Infinite Map

Detect the position of the character and download the map texture and elevation data automaticity while running the game.
Add some of the infinite map scripts to a game object in the scene, fill the fields of setting and run the scene. It will load the pieces on the edges when the character object is moving.
*open the example scene **infinite map** to see how infinite map works.*


## Character and Ground setting

To play with the infinite map, you need to add the ***infinite map*** script and a Gameobject as the character.




Drag the character Gameobject to the **CharPos** field, and select the layer which the pieces of terrain in.

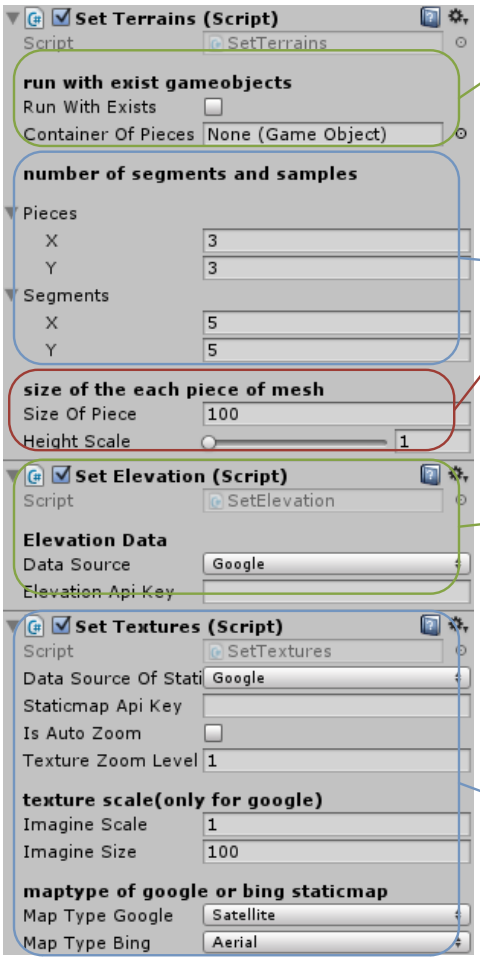
The script detects which edge the character is approaching to by check which piece of ground it is on. The Layer of Ground field is the layer mask to avoid other objects which are not supposed to be check.

If you set a default layer when generate terrain, the layer mask should be same as the default layer you set.

## Terrain Setting

The setting of infinite map is as same as setting them in editor window.

The script ***SetTerrain*** is required, and the other components can be deleted or disabled if they are not needed.




It can run with existing raw data mesh at the beginning of the game .
Add the parent game object to the container field, it's recommended to put the character object on the center one of the pieces.

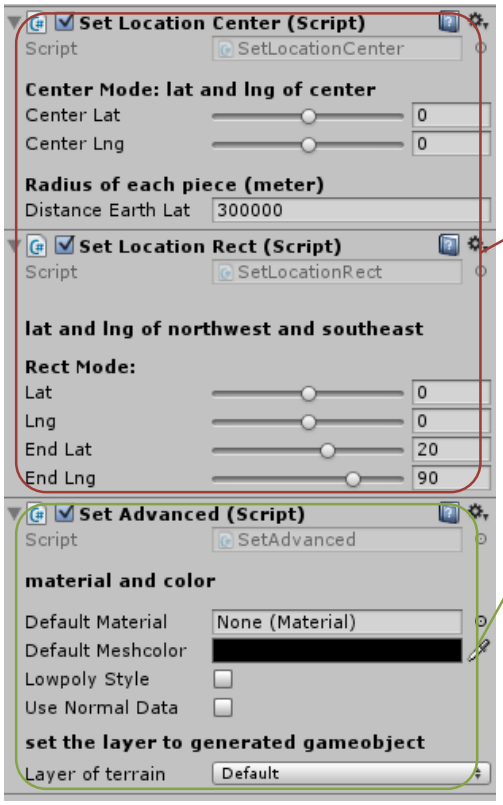
Generate Setting of the terrain.
If **RunWithExists** is checked, the pieces , segments will follow the raw data.

When the game running, new pieces of terrain will follow the certain value

Paste your API key to the API field, the key must be Concerted With the data source you selected.
If you do not want to load the elevation data, Set the data source to random .
Delete or disable the component also make the terrain with a random height.

Paste your API key to the API field, the key must be Concerted With the data source you selected.
The zoom level and texture size settings are same as that in the RTM manager window.
The map types of two data source are both present here, the data source you choose decides which to use.

Delete or disable the component to avoid the texture loading.




Location and Area setting.
The new terrain is base on the set location and distance whether the **RunWithExists** is checked.
You can choose to use the Center mode or Rect mode by add/delete or enable/disable the component.
Do not add let them enabled at the same time, if they do, it will run as the center mode.

Style setting of generated terrain.
If the component is deleted or disabled, it will use the default value.

# Notice

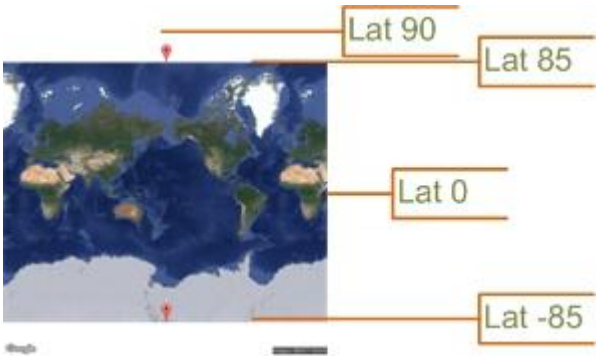
## Zoom Level Error

If you receive a texture like this, it means Google does not present the image at this zoom scale.


Try a smaller size or set the ***zoom level*** manually. Try another data source also works for some area.

## Geographic Coordinates Limits

Google and Bing static map service does not present a imagine over lat +-85.
if you want to create a terrain in this area anyhow, try ignoring the texture.




## Imagine Size

The static map API has limits of the image size. so the number of pieces determines the quality of the texture.
A larger value of pieces.x and pieces.y lead to better texture, and slower speed.
The more the number of pieces, the more things might go wrong. It's not suggested to set the pieces larger than 10*10 for one time.

## API limits

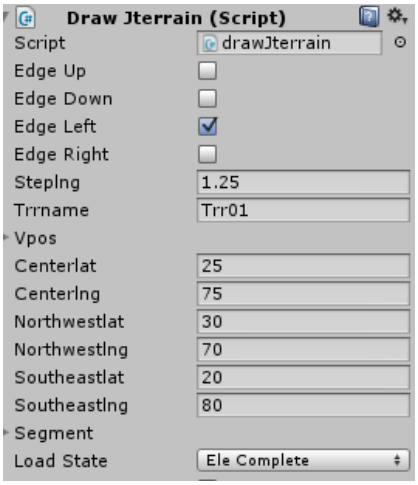
The Elevation API also has limits on the number of elevation samples, and the times of requirements in one day.
If you work under a free API of Google, confirm the *segment* less than 511 ,and the product of the number of pieces and *segment* should less than 2500.
If your key is out of the requirement in one day, use another key in the ***setting window*** and ***Retry***.
It's not suggested to change data source when you got errors and retry, for the data of different source might have differences.

## Download Errors

while using the Google map service you might meet some error message.
The debug log and warning in *Console Tab* shows the status of loading data and creating meshes. you can ignore them most of the time.

If you cannot download the right texture you want, try your query in your web browser.
**example:**
https://maps.googleapis.com/maps/api/staticmap?center=location-lat,location-lng&zoom=your-zoom&size=your-sizexyour-size&maptype=your-maptype&key=your-API-key
You can copy the query from the debug log.


According to the network condition, you may receive an SSL error or Time out error, ***Retry*** or change to another data source.




The ***Retry*** operation will reload the pieces with loading error. You can check out the loading state of the piece on the game object.

if you get some other problem, try copy the query in debug log to your web browser, and check the responses at
https://developers.google.com/maps/documentation/elevation/intro#ElevationResponses
https://msdn.microsoft.com/en-us/library/jj158961.aspx#HTTP Status Codes
https://msdn.microsoft.com/en-us/library/ff701724.aspx#HTTP Status Codes

**contact me:**

http://saengine.blogspot.com/
sakuraplus@163.com