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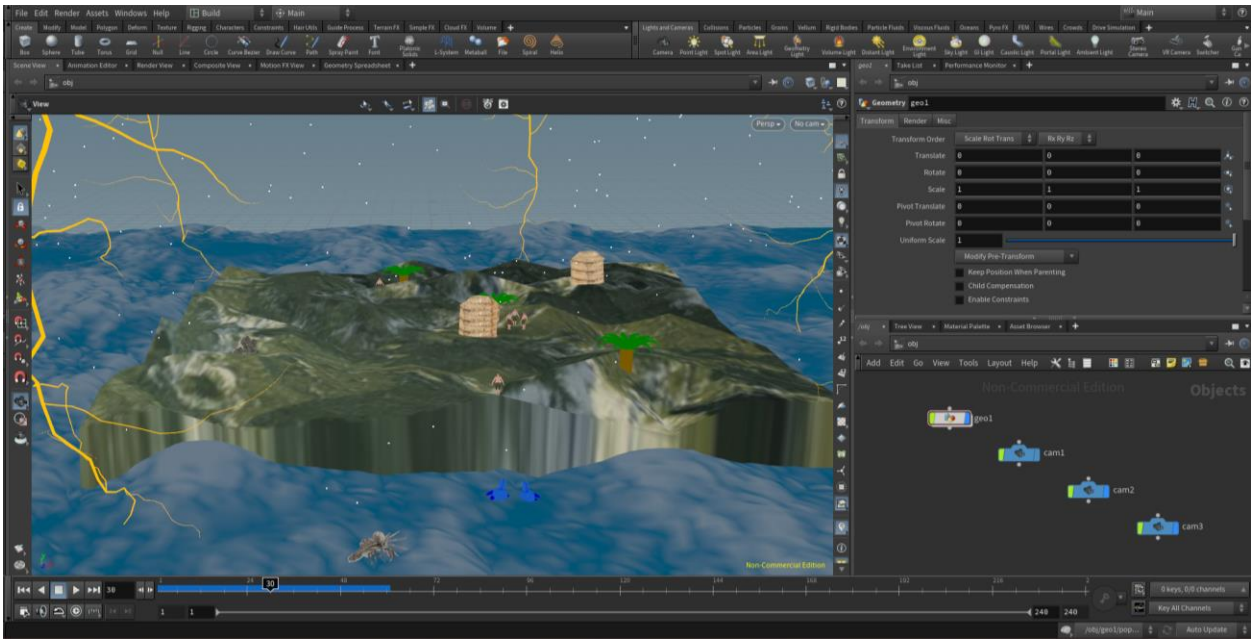
Project Documentation

Storm and Rain

Proposal: This project aims to create a stormy weather in a neighborhood. I am going to use a grid. One of the layers will be an ocean and a layer, in the middle I will build an island. For the island, there will be some houses and some people. I also added some trees and then added the animals in the ocean and some monsters on the island. I am going to utilize RBD material fracture and RBD bullet solver to break or destroy the house, trees due to the storm. I am going to build an ocean as the bottom or base. I will try to use most of the nodes explained in class when building this. Additionally, to make it look more lovely, I will add something else.

Project Description

I am going to design a stormy weather for this project, and the setting will contain an ocean, an island, houses, humans, animals, clouds, rain and lightning. To give you a clear understanding of how this project is constructed, I will break it down into 4 components. The base makes of one portion as ocean, followed by the island, humans and houses are the third part, and the clouds, lightning and rain are in the fourth part. The project is structured using a grid. The completed project will look like the picture below.



Part-1: To build the ocean surface

As a first step, we need to change the network editor pane in Houdini from objects to geometry once we have opened it. To do this, you will need to add a geometry node to the network editor pane and double click on it once you have added it. Having entered the geometry node, you can click on the tab within Network editor pane and find the node grid by searching underneath the tabs. All the three parts

which we will be using in this project will be based on this grid as it will provide a base for all of them. Figure 1.1 shows the Grid's parameter pane.

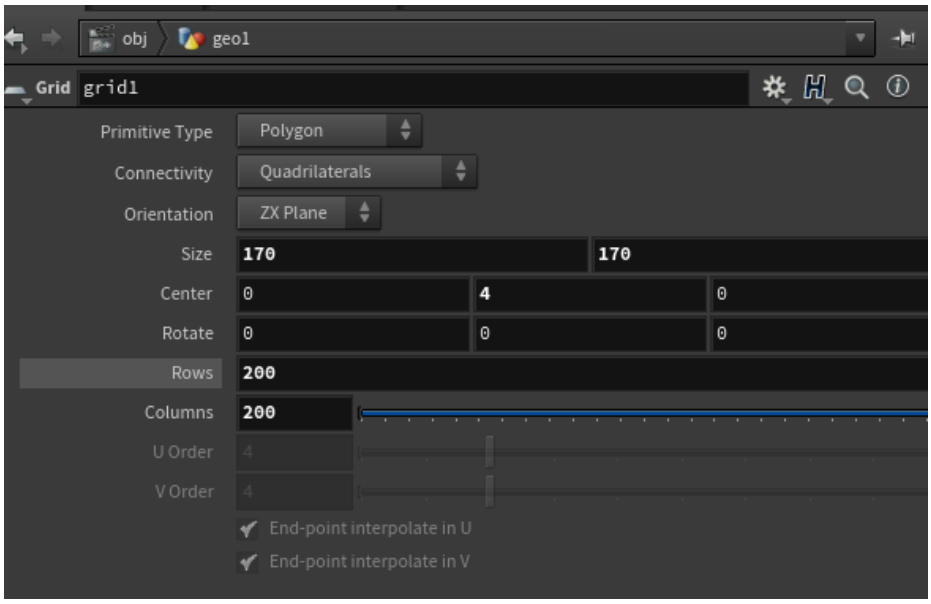


Fig 1.1 - Parameter pane of grid node for base

In order to add the ocean surface, we need to add the ocean spectrum node and the oceanevaluate node. We add the grid node and the oceanspectrum node to the two points of the oceanevaluate node. We add the polyextrude node to the oceanevaluate node.In order to increase the thickness of the base, we need to add a polyextrude node. An oceanevaluate node's output will be used as input for a polyextrude node. Figure 1.2 shows the parameter pane for this polyextrude node

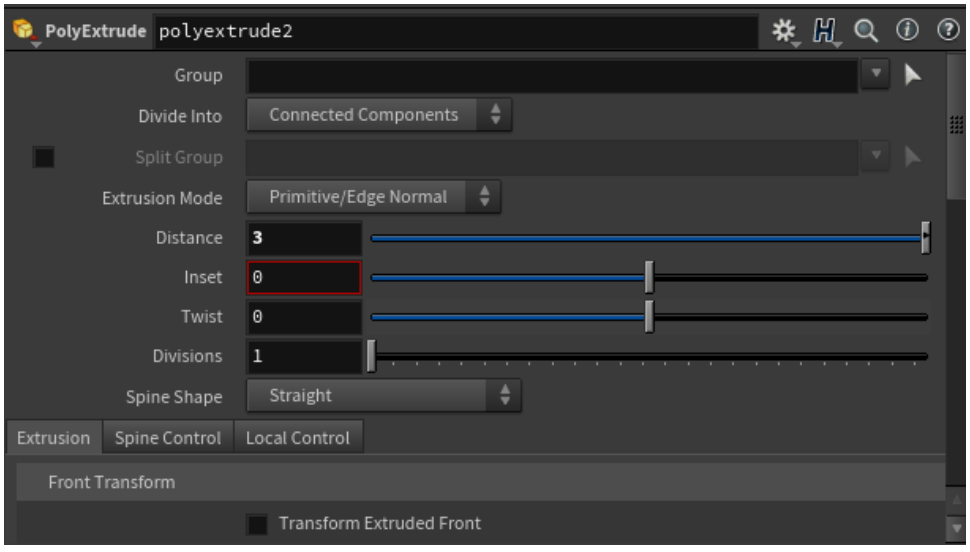


Fig 1.2 - Parameter pane of polyextrude node

To make the base more like the interior of the ocean, I'm going to add another grid node and add polyextrude to make it look like a surface layer. We then add a uvquickshade node to the polyextrude node. The uvquickshade node has a parameter to give the ocean like picture. Fig 1.3 shows how it will look once the uvquickshade has been added.

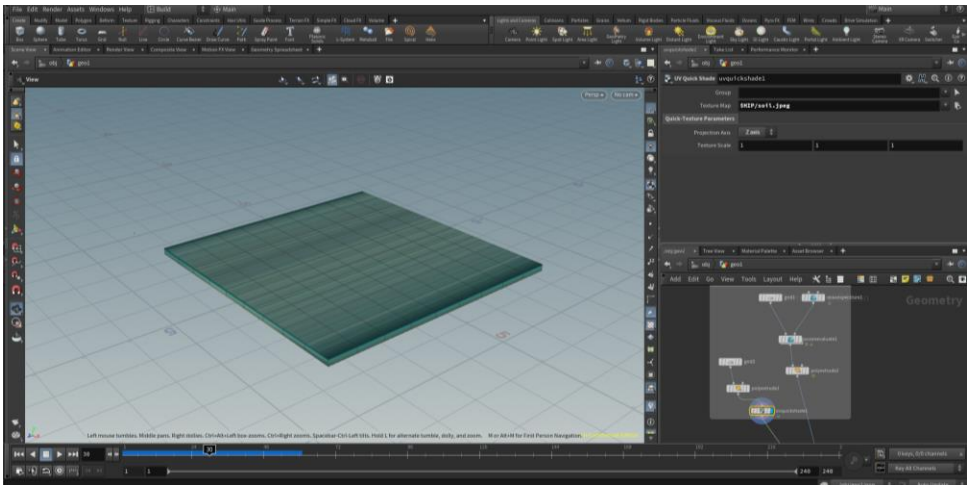


Fig 1.3 - view of the ocean base

Part-2: To build the island

2.1 - Base of the island

In order to build a base, we will need a grid node, and the parameter pane will look like Figure 2.1.1. We will use this grid node to build the entire island. On this island we are going to build huts, humans, animals, trees, sea animals, and a monster. We use the mountain node on the grid node to make it look like a terrain and then adjust the amplitude of the mountain. We than add a polyextrude node to make it look like the island is above the ocean level. Next, we use the uvquickshade node to make the terrain image on the grid node.

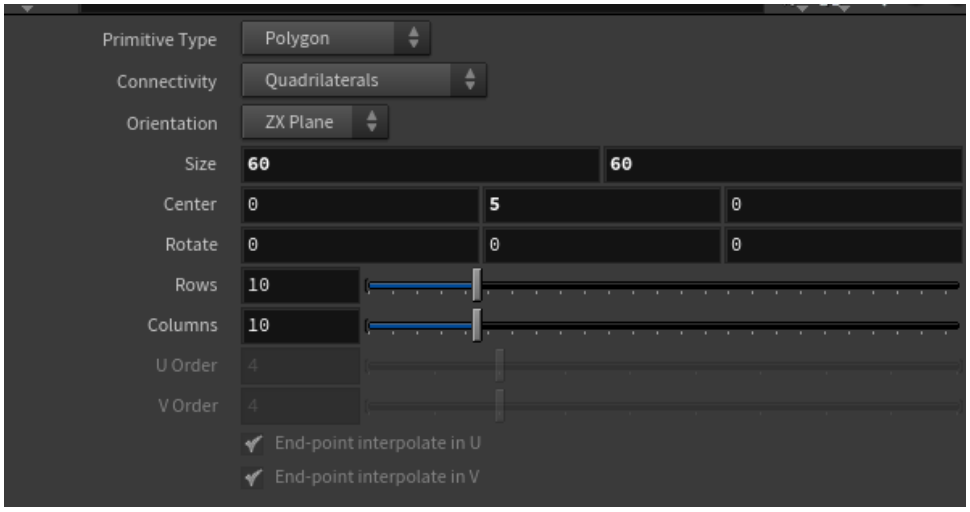


Fig 2.1.1 - Parameter pane of Grid node for park

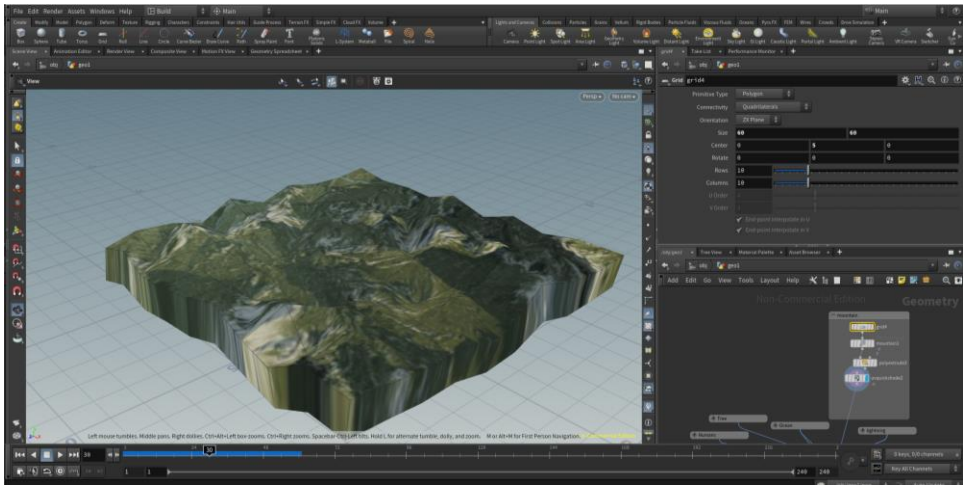


Fig 2.1.1 – view of the Island grid.

2.2 – Humans and monsters on the park

We will now create humans in the island. In order to set the points for the humans, we need to add the test geometry nodes. Figure 2.2.1 shows the test geometry tommy node's pane. The input for this node will be the translate, rotate, uniform scale, resolution and clothing. We will now create multiple nodes of test_geometry_tommy and place them at multiple places on the island. Then we will use the other test_geometry figures such as the crag (monsters), squab, rubber toy (sea animals). We merge everything creating with test geometry nodes using the merge node. Figure-2.2.2 shows the parameters for this crag node which will be our monsters. Fig-2.2.3 shows the parameters for the squab node, which will be the sea animals near the island. A copy_to_points node can be added to all the test geometry nodes in order to copy them instead of creating multiple times the same node. As shown in Fig-2.2.4, the merge node shows all the things created using test geometry nodes.

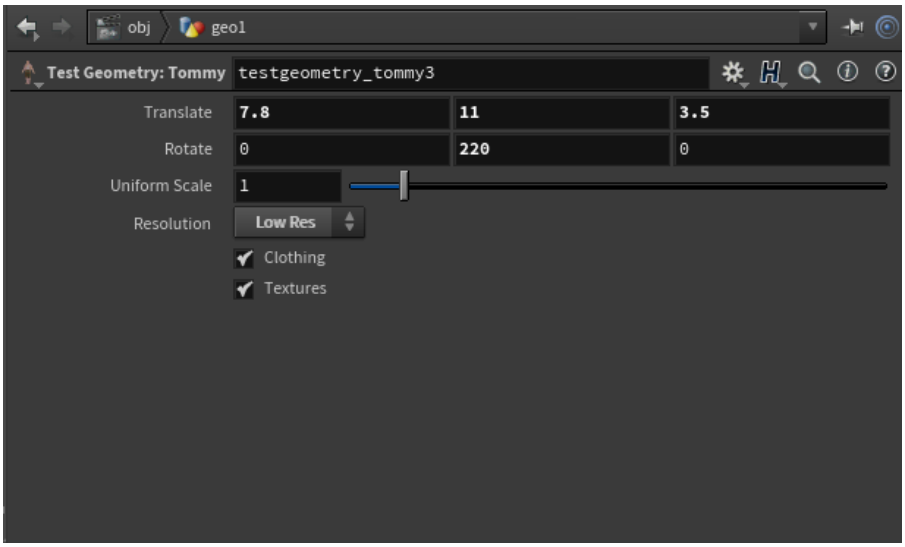


Fig 2.2.1 - Parameter pane of Tommy node

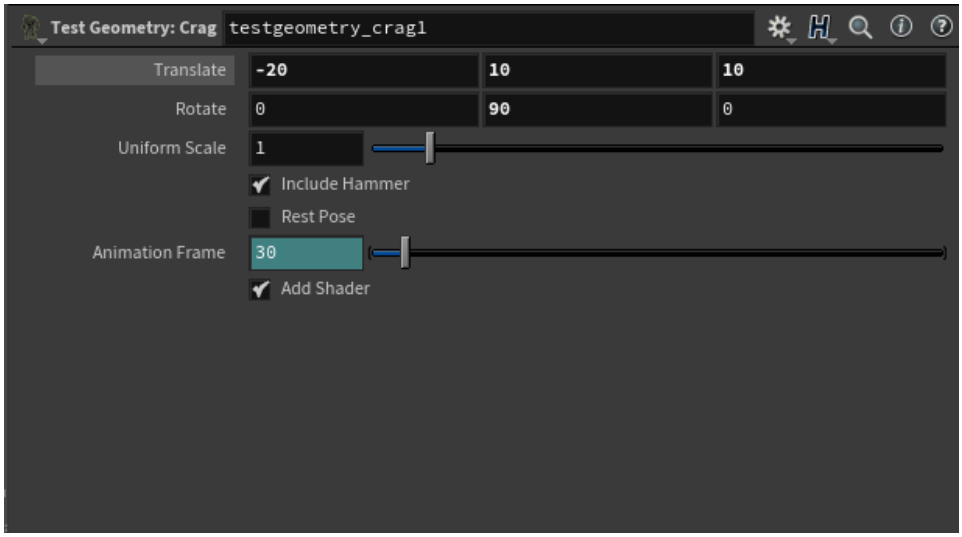


Fig 2.2.2 - Parameter pane of crag node

Fig 2.2.3 - Parameter pane for squab node for sea animal

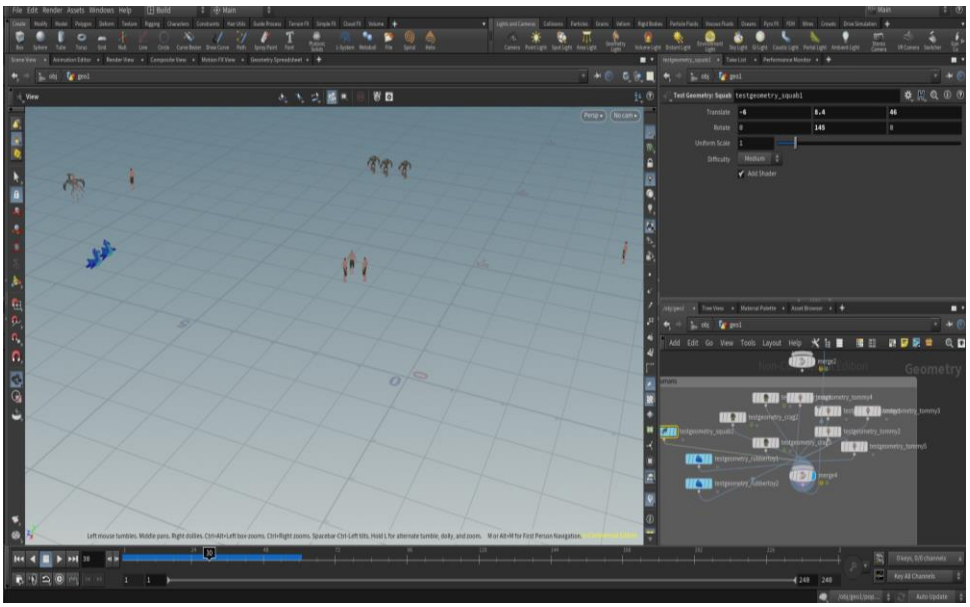


Fig 2.2.4 – Scene view after merging the test geometry nodes

Part – 3: Building Houses and Trees on island

To build this I am going to divide it into two parts. The first part is to build houses on the island, the second part is to construct trees in between and create a neighborhood on the island.

3.1 - Houses

A tube node, a circle, merge, polyextrude, merge and a uv quick shade node are needed to build this house. They must be connected as shown in fig-3.1.1. The tube parameters for one of the houses are shown in Fig-3.1.2. The circle node forms the top structure of the house. In the same way, we need to create another house. For the second house, the copy and transform node will only be used and changes along the different axes.

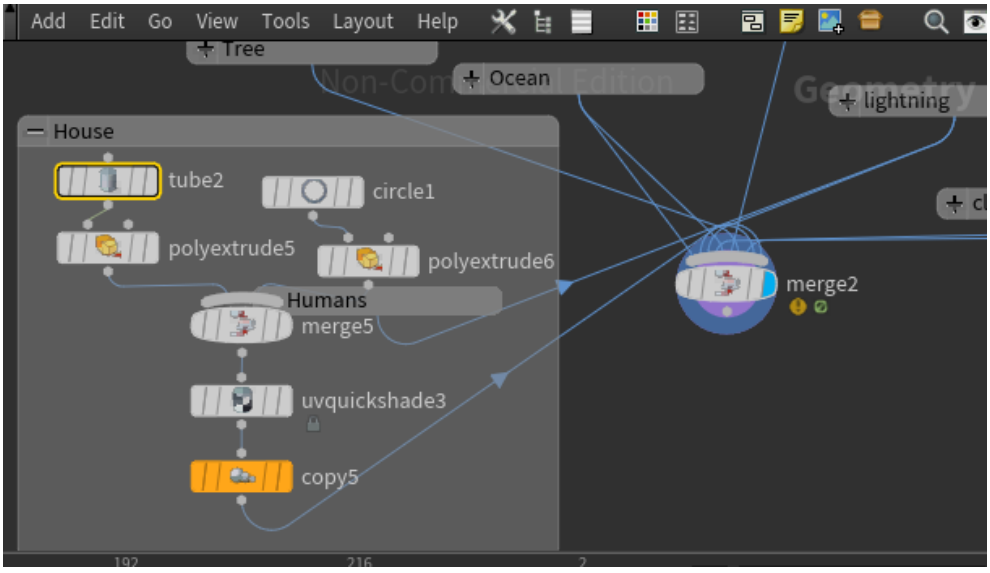


Fig – 3.1.1 - network pane for the house

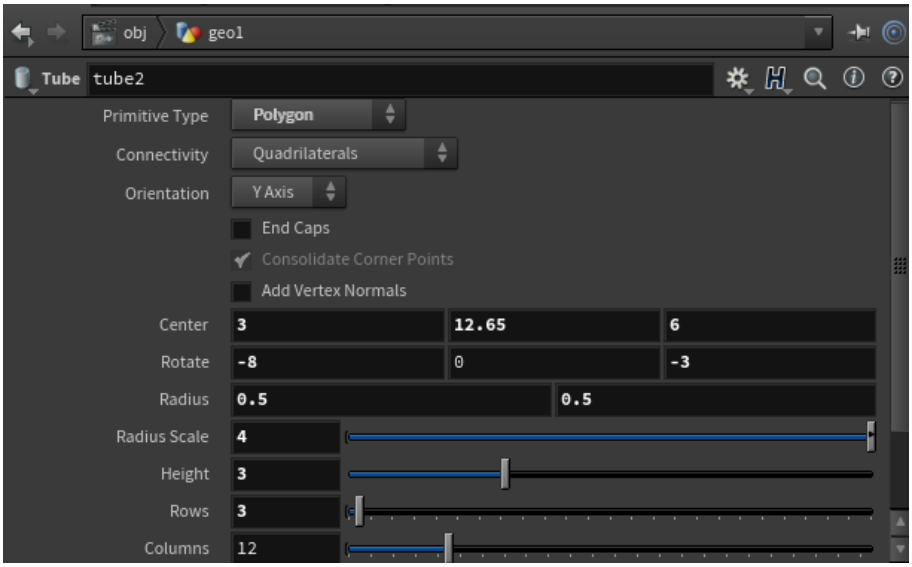


Fig-3.1.2 - parameters for tube side of the house

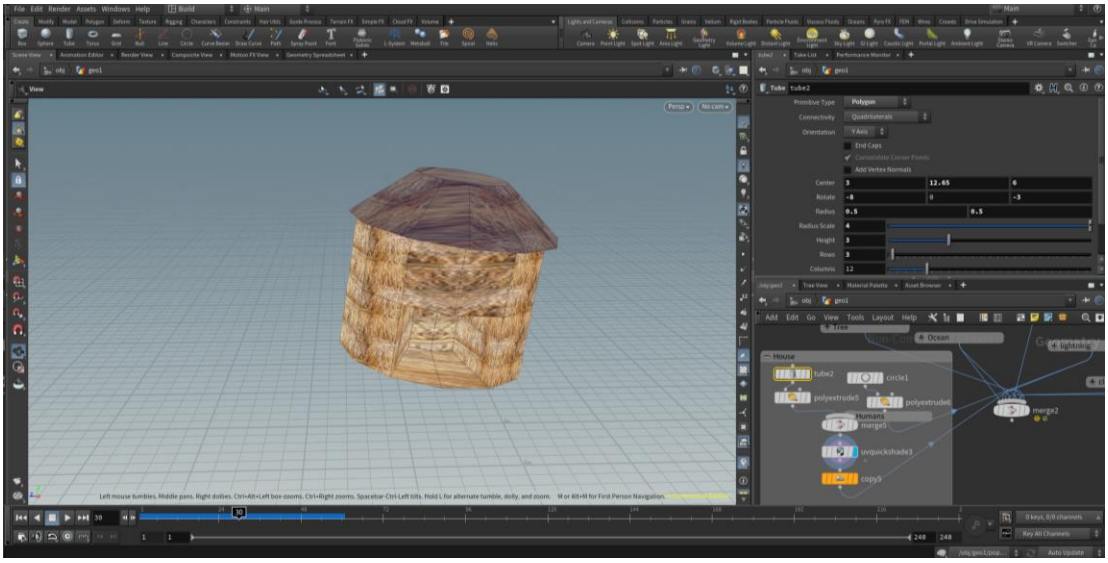


Fig-3.1.3 - House after using uvquickshade node

We use the merge node to connect the top of the house made from the circle and the bottom of the house made by using the tube node. After merging them we use the uv quick shade node on the merge and then give it a straw hut like texture. The last step is to use copy and transform node to create copies of the house and place them at various places.

3.2 - Trees

Adding a curve node, box, resample, revolve, tube, transform and color will help us build a tree. Curve node parameters are shown in Fig-3.2.2. The curve will be of NURBS type. Then we need to arrange it on the tube we created earlier. To accomplish this, we need to change the center along the Y and Z axes. To increase the thickness of the leaves, we need to add a transfrom node. Fig-3.2.3 shows the parameters. The color will be added to a color node.

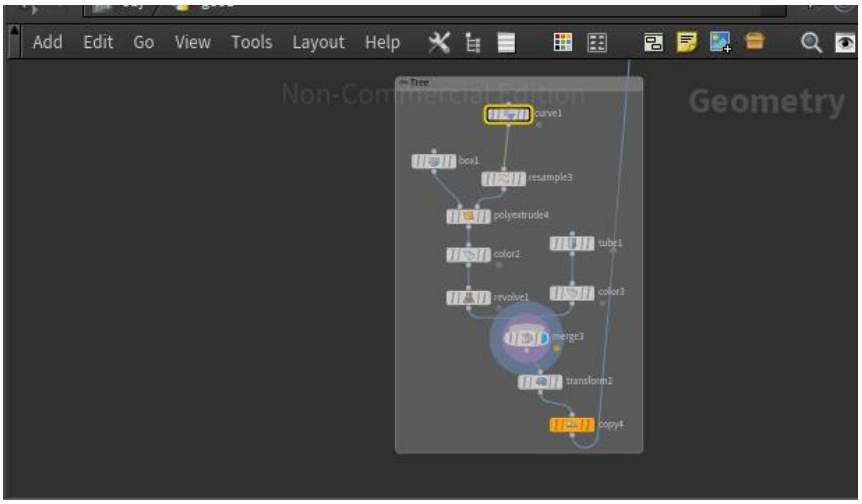


Fig 3.2.1 - Network pane for Tree

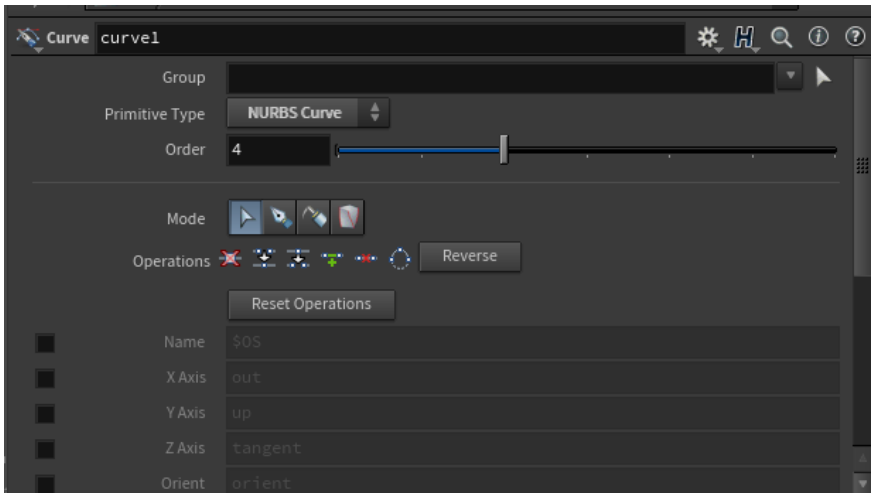


Fig 3.2.2 - parameters of the curve for tree

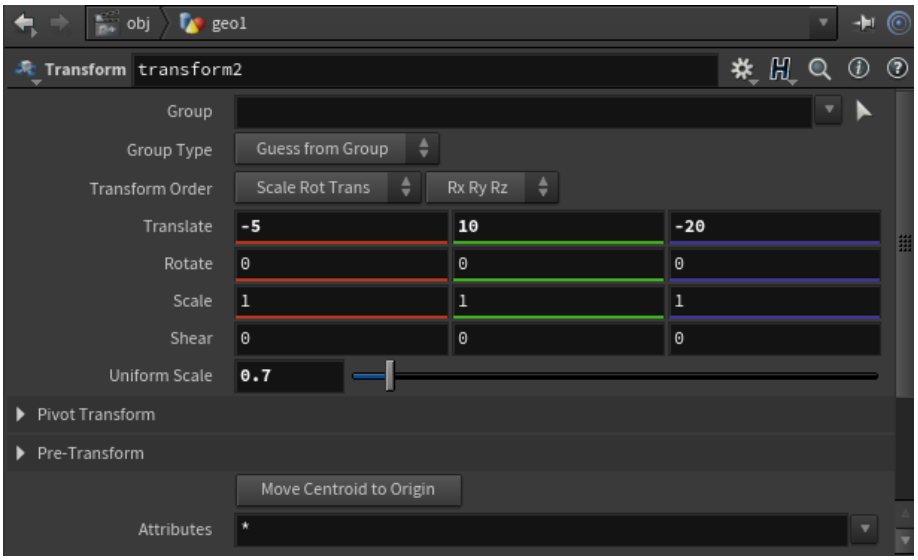


Fig 3.2.3 - Parameters of the transform for tree

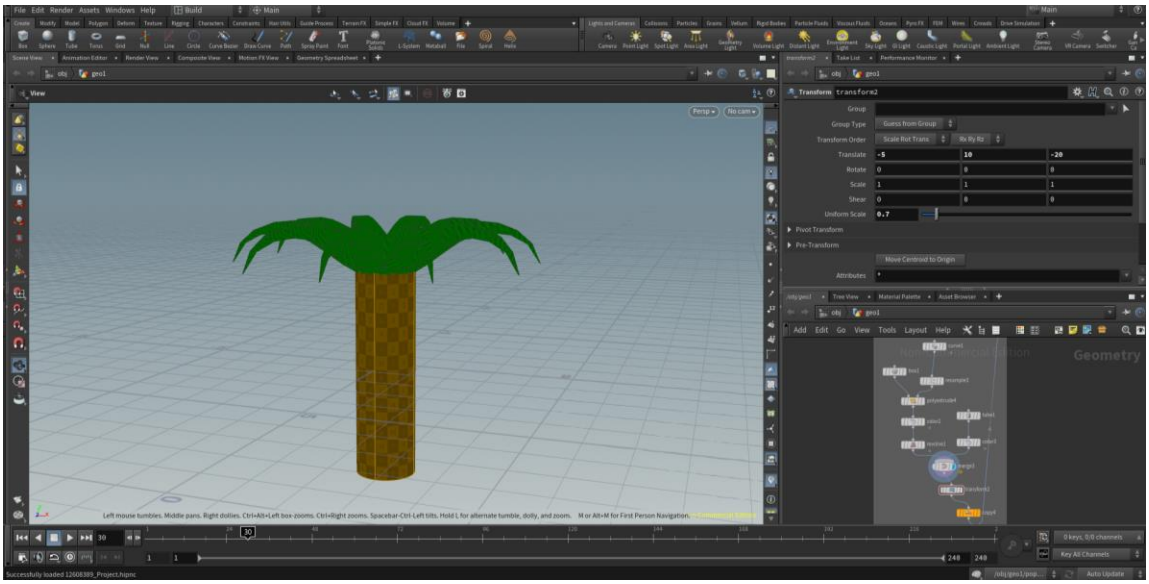


Fig 3.2.4 – Merge node of the tree

In the next step, we need to add a copy and transform node. So that we can transform the copies through the island.

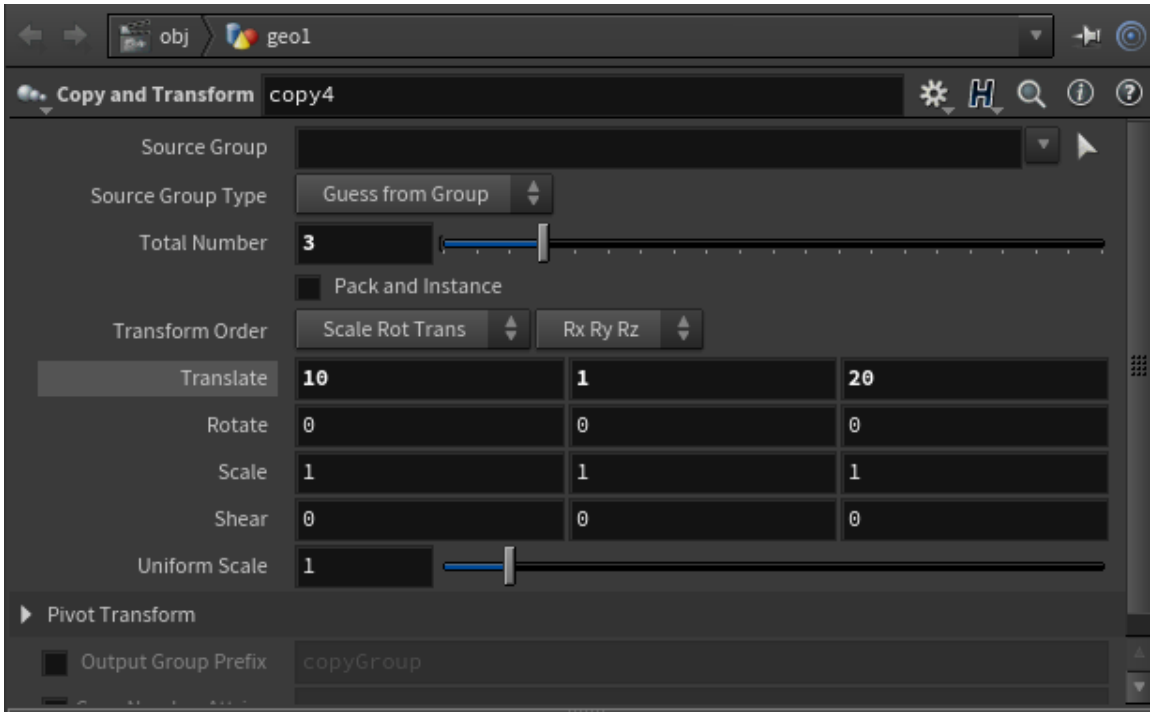


Fig 3.2.5 - Parameters of copy and transform node.

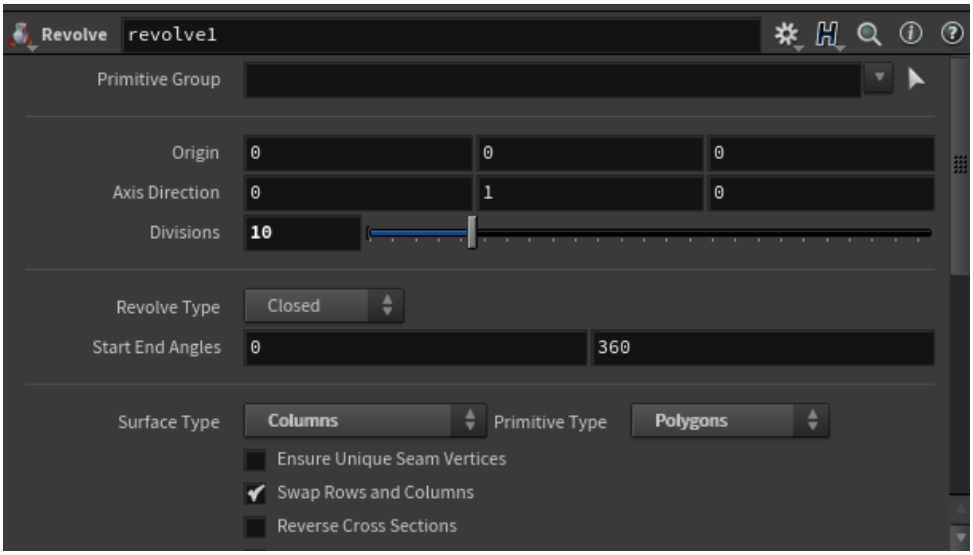


Fig 3.2.6 - Parameters of properties in revolve node.

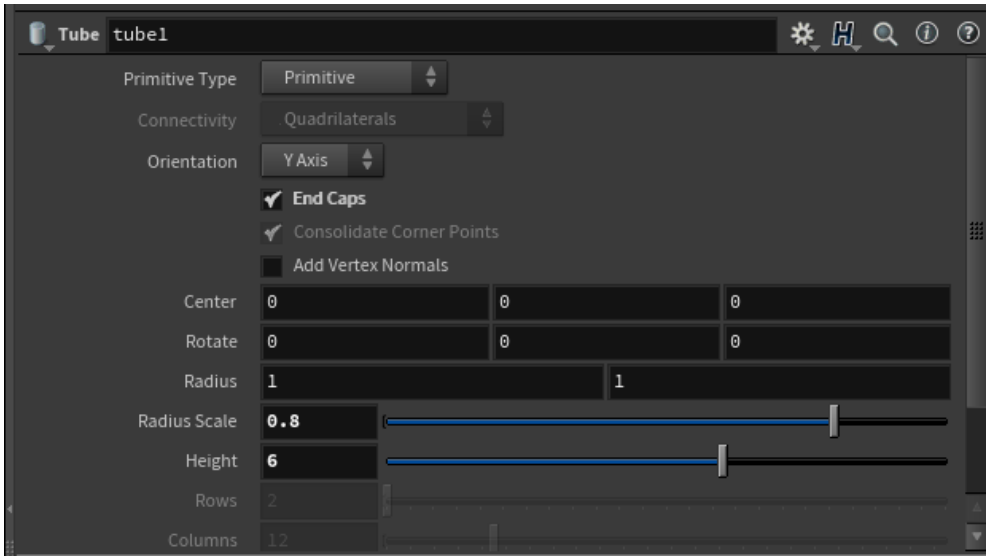


Fig 3.2.7 - Parameters of tube as tree bottom

Part – 4: Clouds, Rain and Lightning

4.1 - Clouds

I used a grid, cloud and copy and transform nodes to show the clouds on the top side. I kept the size of grid as 150*150. Then changed its position in y axis as 54 and set rows as 10 and columns as 10. It looks as shown in Fig 4.1.1. I am going to add the orientation as zx plane.

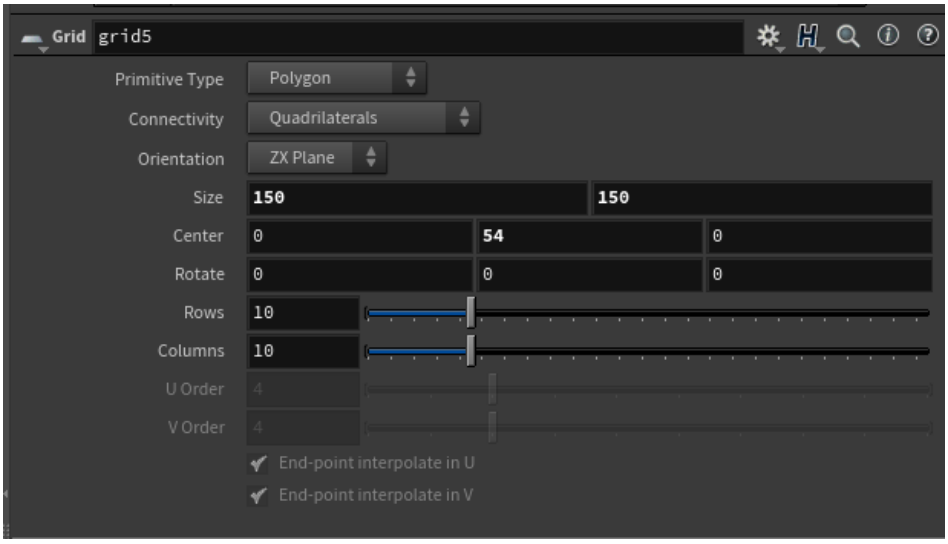


Fig 4.1.1 – parameters of cloud grid node

Once everything is done, we need to connect the cloud node to the grid node, cloud node has the div size as 3 and the then we go to the density parameter. We give the density multiplier as 3.3 and the density ramp can be seen in the Fig 4.1.2.

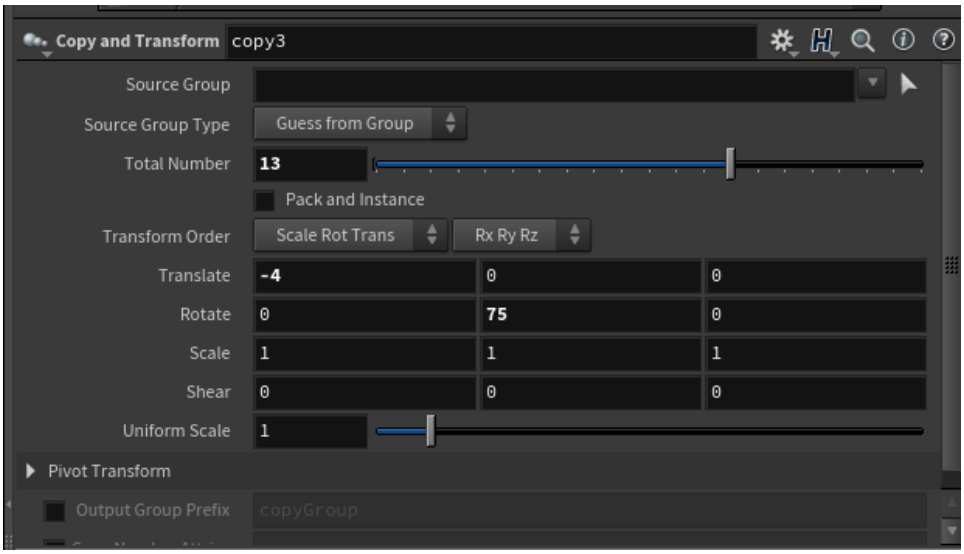


Fig 4.1.2 – parameters of the copy node

After the cloud node, we need to connect the cloud node to the copy and transform node. Copy and transform node creates multiple copies along the top to make them look like rainy clouds. We give the total number as 13 and then we use the translate the clouds along to look like random distribution. We can observe the clouds after using the copy and transform nodes in Fig 4.1.3.

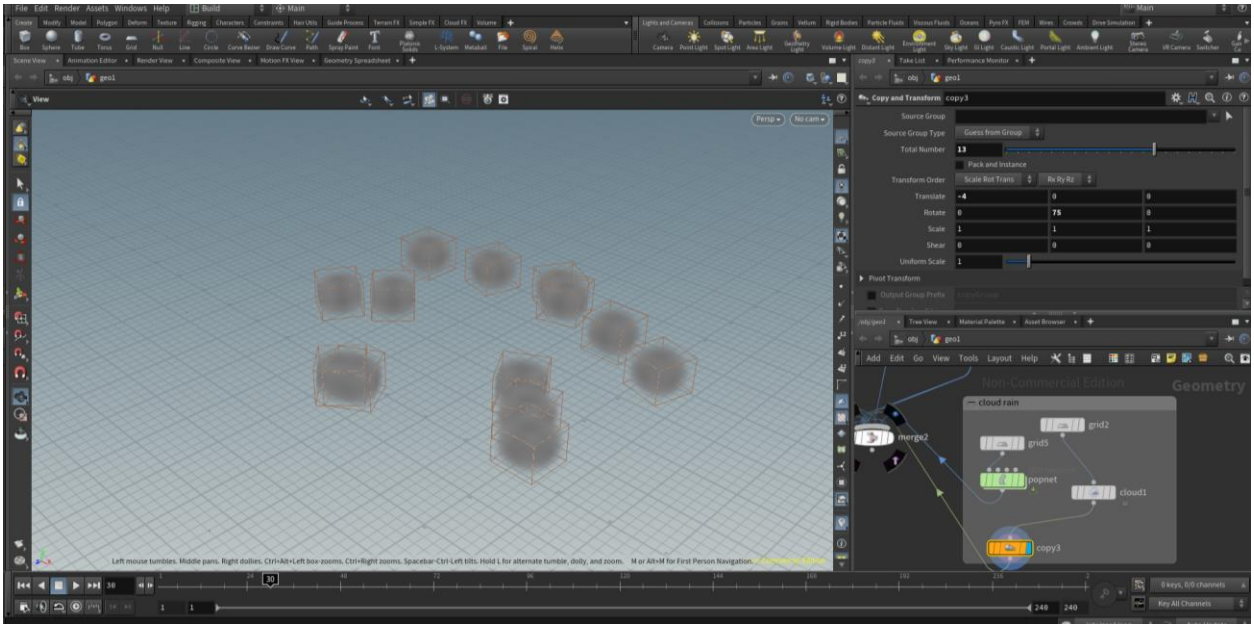


Fig 4.1.3 – screen view of the clouds

4.2 - Rain

After the creation of the clouds, we need to create another grid and pop network node for the Rain. The grid is of size 150*150 and the rows as 10 and columns as 10. The primitive type is polygon and the orientation is in ZX plane. The parameters of the grid node for the rain node can be viewed in Fig 4.2.1.

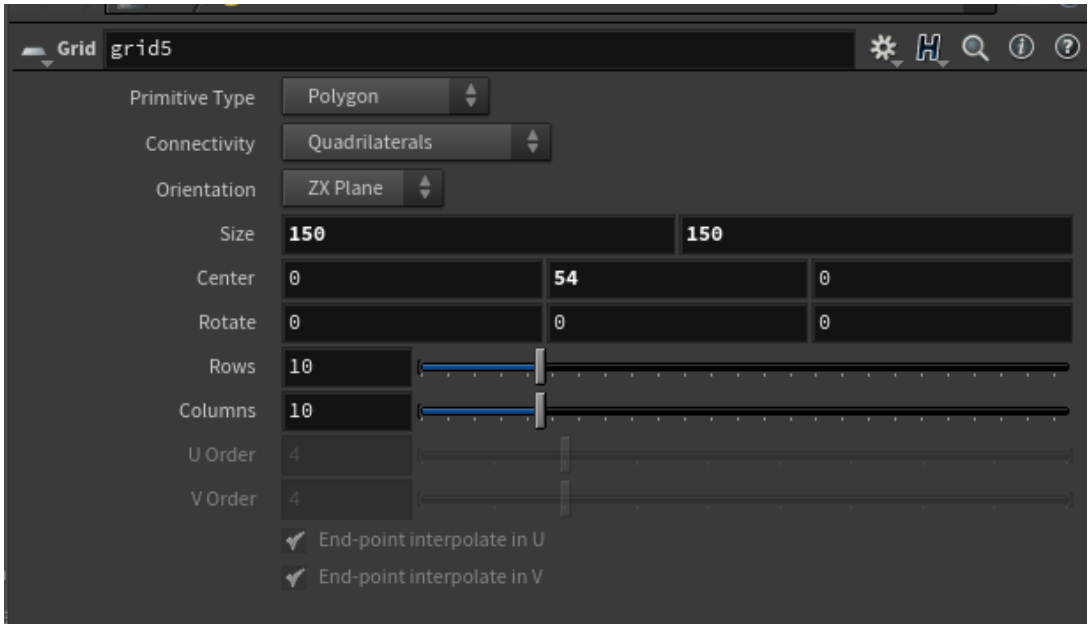


Fig 4.2.1 – parameters of the grid node for rain.

After the grid node is created, we need to edit the parameters for the pop network node. The simulation parameters are changed such as timestep to 0.1175. The scale time to 2.82 and maximum feedback loops as 2. The parameters of the popnet node for the rain node can be viewed in Fig 4.2.2. We right click the

popnet node to enter the sub network of the popnet and change the parameters at that level to make it look like rain. We change the parameters of the source_first_input node and give the birth rate to 500.

We give the life expectancy as 100 and in the Attributes parameters we change the initial velocity to add to inherited velocity. We then give the velocity in y-axis as -1 and the variance in y-axis as 10. The parameter pane of the source_first_input node is shown in the Fig 4.2.3.

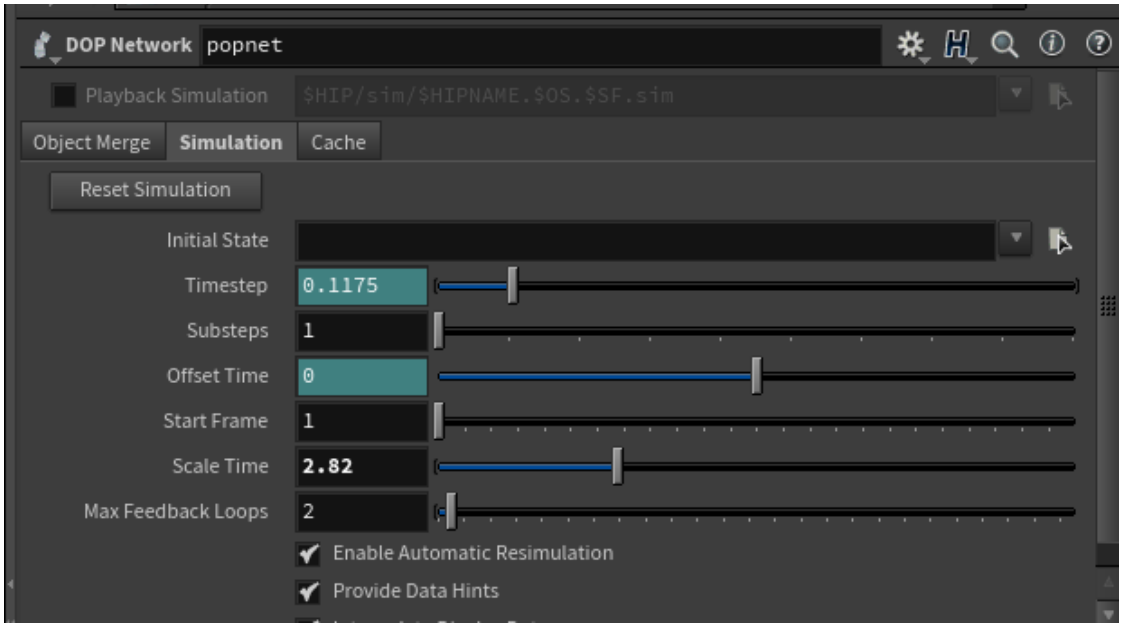


Fig 4.2.2 – parameters of the popnet node for rain.

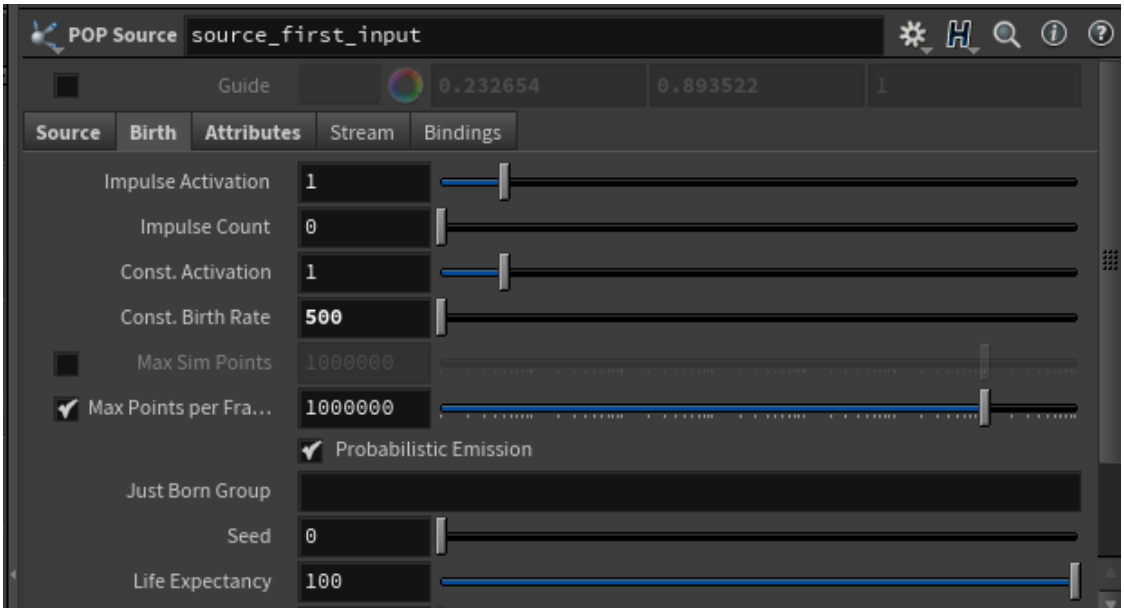


Fig 4.2.3 – parameters of the popnet node for rain.

Then we need to edit the parameters of the substeps, collision behavior of the popsolver node. We need to change the time scale to 10 in the substeps parameter. And then in the collision behavior we change the color hits to white and then change the response to die from unchanged. The parameters of the

popsolver's popnet node in Fig 4.2.4. And then we add these two copy and transform from clouds and the popnet from the rain to the merge node where all the geometry nodes are connected.

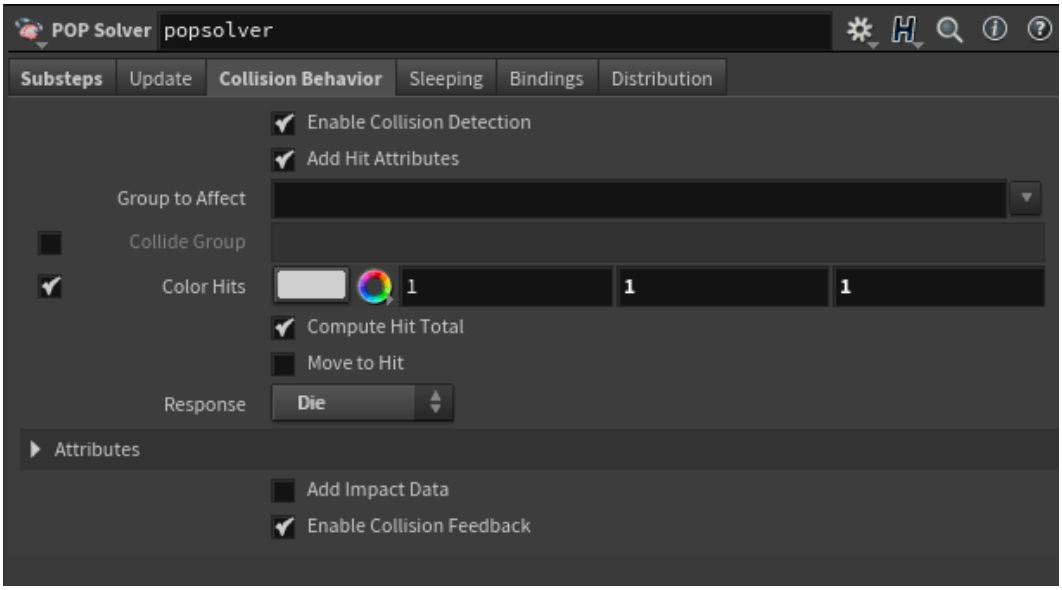


Fig 4.2.4 – parameters of the popsolver node in popnet for rain.

4.3 – Lightning

In order to create a lightning, we need the add, line, resample, blast, copy and transform nodes. First, we create a add node that adds points which is on the Fig 4.3.1 on the geometry with the points given and then connect it to the resample node to create 30 segments. We then add the attribute wrangler node to make it write the VEXpression and write to create the prob, width and the blend attributes. We then add a polyframe node and then give the parameter tangent name as N. We then add another attribute wrangle to create the group prob parameter. We then add a blast node and name it as the delete_except_prob and then give the prob as group in blast.

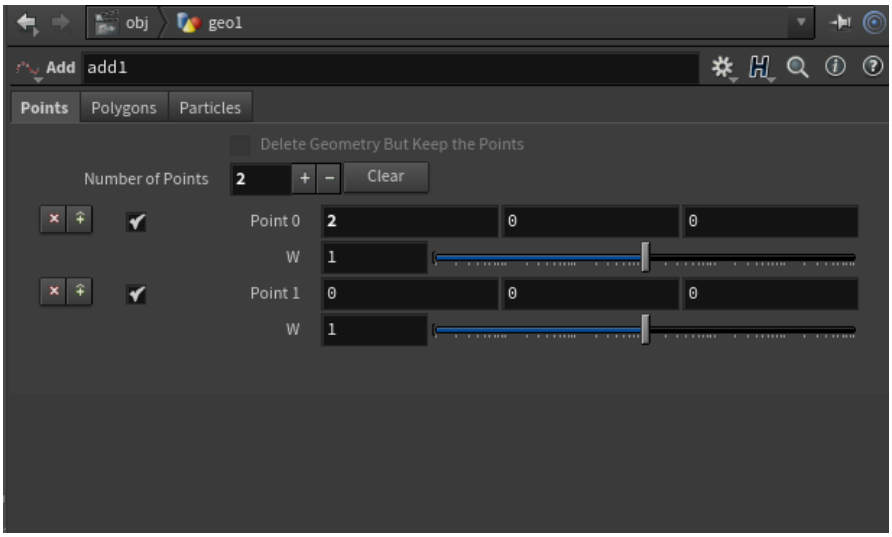


Fig 4.3.1 – parameters of the add node.

Then we add the line node with the parameters as the direction in y-axis as 1. The length of the line is 0.4 and the points are 2. We add the attribute wrangle to line and give the VEXpression as @width=5. Next, we add the copy to points node and give left as attribute wrangler from line and right of the copy to points as attribute randomize. When enabled the copy to points we can view the screen view as in Fig 4.3.2.

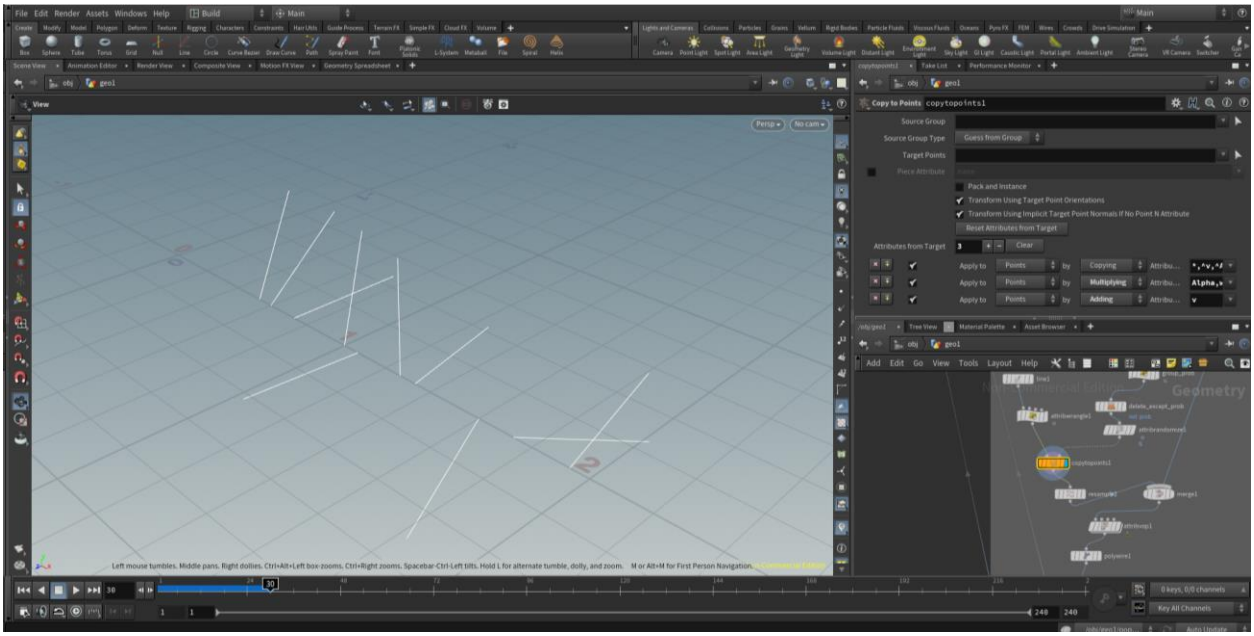


Fig 4.3.2 –Screen view after adding copy to points node.

Then we add the resample node to the output of the copy to points node. Next, we merge the output of the resample node and the attribute node first connected to the add node. The merge node output looks like the Fig 4.3.3 in the shape of the lightning branches.

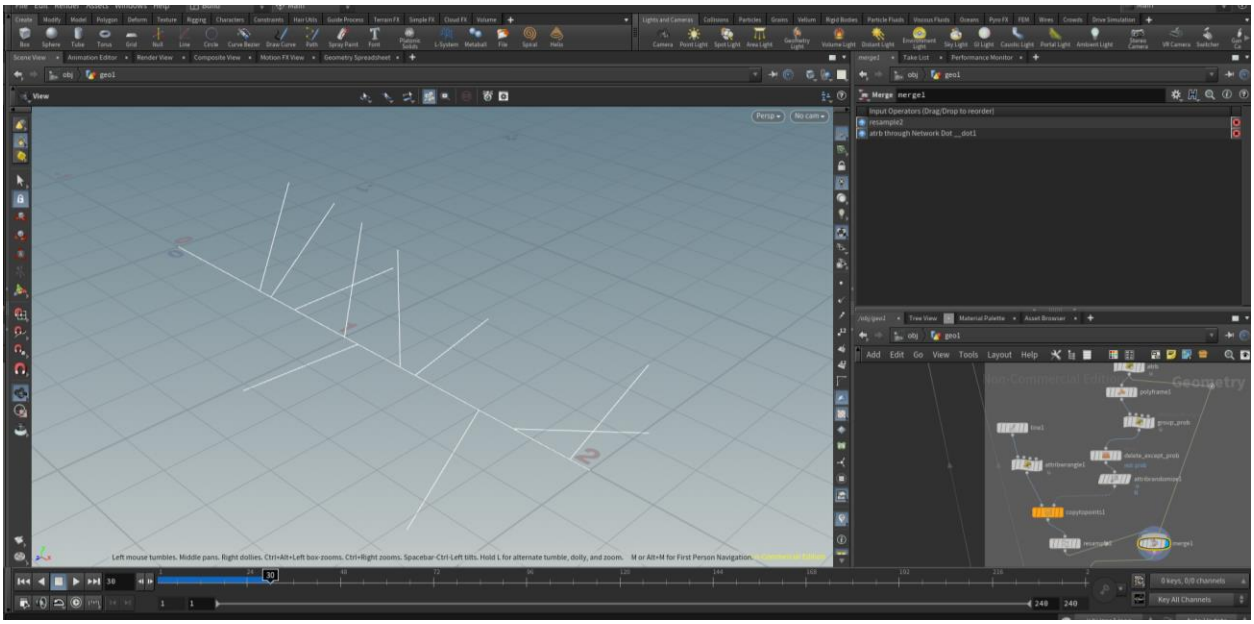


Fig 4.3.3 –Screen view after adding copy to points node.

Afterwards, we create a attributevop node to make them look like lightning shape. Then we add the polywire node to the output of attributevop node. We then add the color node to the output of the attributevop node. We give the color as light yellow to make it look like lightning. We then add the transform node to make it look like from the clouds. The image of the lightning is like in Fig 4.3.4. And at last we add the copy and transform nodes to the transform node to multiply the lightning strikes.

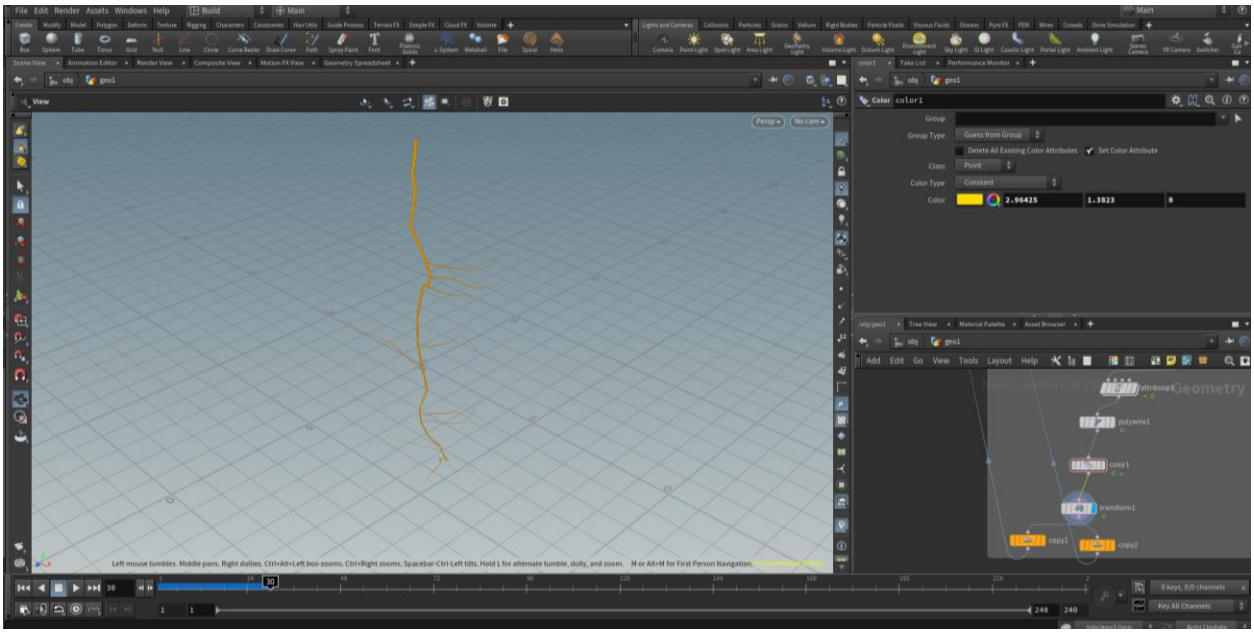


Fig 4.3.4 –Screen view after transform node.

At last, we add all the nodes to the merge so that the view is obtained. The merge node on the blue flag is on so that the whole project is visible. We run the animation to view the stormy weather and rain in the neighborhood. We can observe the network pane in the Fig-4.3.5.

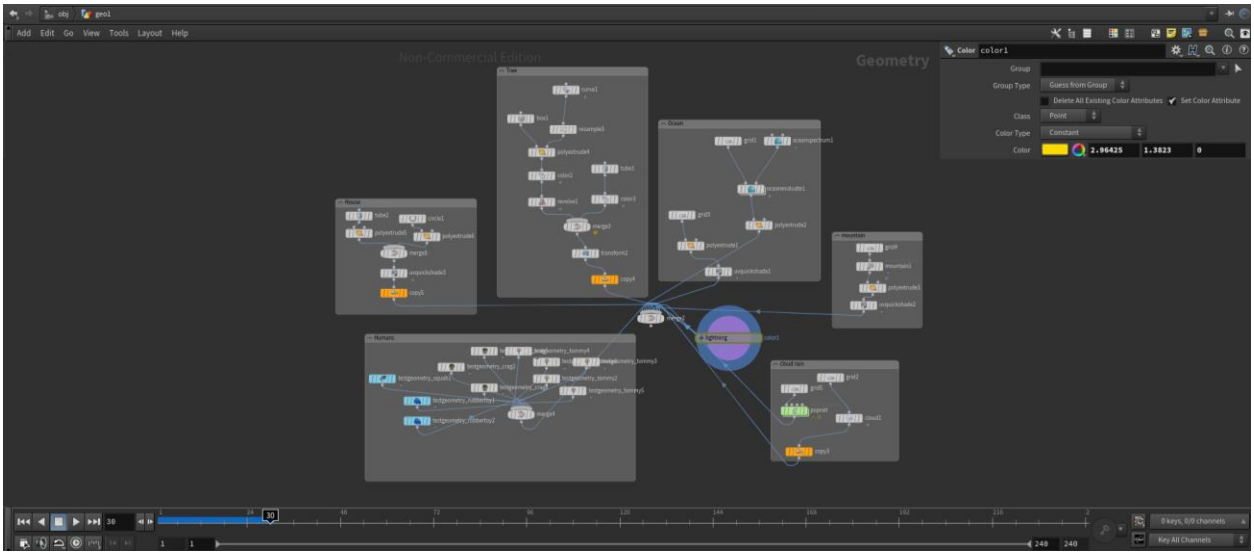


Fig 4.3.5 – Network pane view of the project.

References:

1. Lightning – " https://youtu.be/pkMf5CUKrvI?feature=shared "
2. Houdini Documentation " https://www.sidefx.com/docs/houdini/nodes/sop/cloud.html "