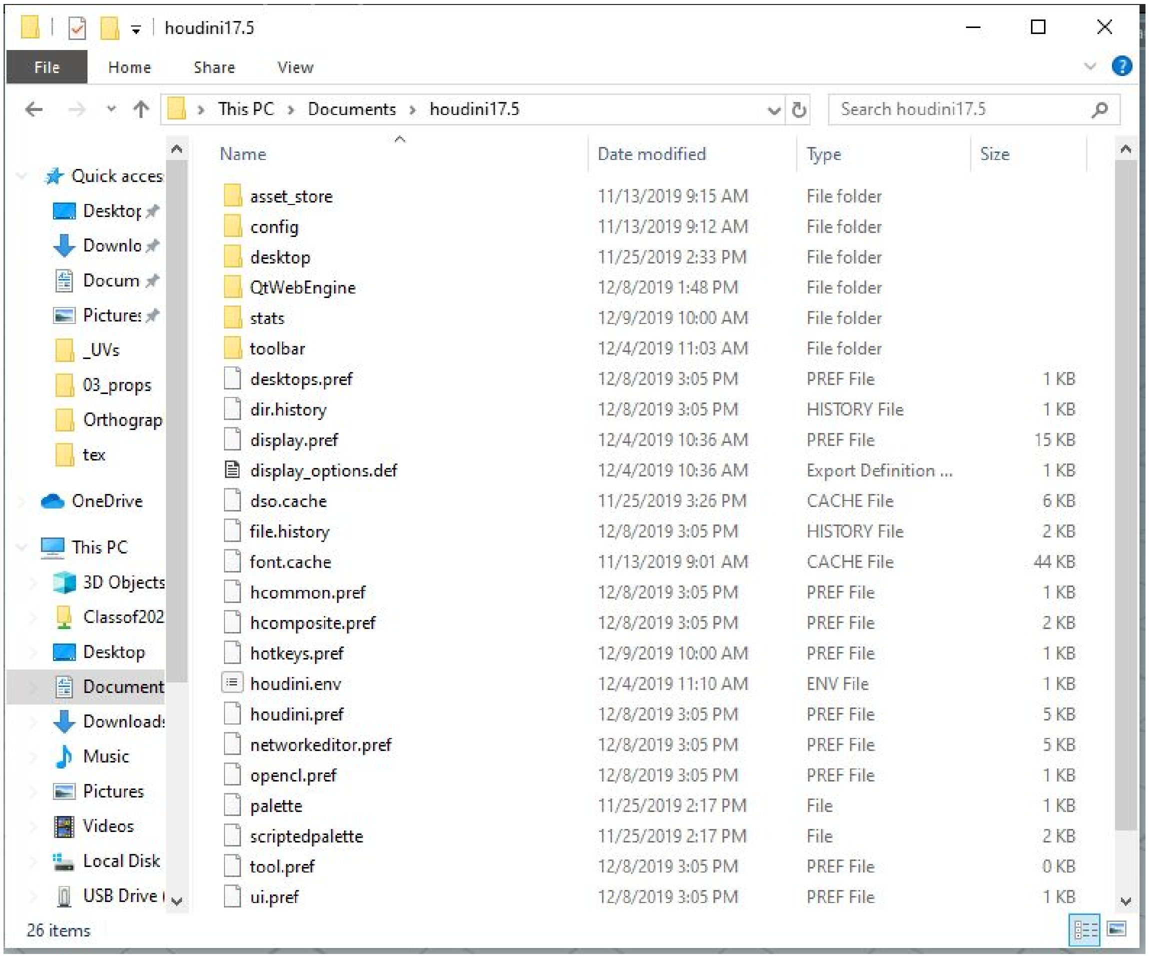
Renderman for Houdini Setup and How to Render Particles

How to Set Up Renderman for Houdini

Setting up Renderman in Houdini isn’t as simple as you would think. Renderman comes pre-installed with Houdini, but rendering will return a “Create process failed for ‘prman’” error if you don’t take the following steps first:

1. Open File Explorer on your desktop.
2. Navigate to C:\Users\[your ursername]\Documents\houdini17.5 (Replace 17.5 with whatever version of Houdini is installed on your computer.



Name	Date modified	Type	Size
asset_store	11/13/2019 9:15 AM	File folder	
config	11/13/2019 9:12 AM	File folder	
desktop	11/25/2019 2:33 PM	File folder	
QtWebEngine	12/8/2019 1:48 PM	File folder	
stats	12/9/2019 10:00 AM	File folder	
toolbar	12/4/2019 11:03 AM	File folder	
desktops.pref	12/8/2019 3:05 PM	PREF File	1 KB
dir.history	12/8/2019 3:05 PM	HISTORY File	1 KB
display.pref	12/4/2019 10:36 AM	PREF File	15 KB
display_options.def	12/4/2019 10:36 AM	Export Definition ...	1 KB
dso.cache	11/25/2019 3:26 PM	CACHE File	6 KB
file.history	12/8/2019 3:05 PM	HISTORY File	2 KB
font.cache	11/13/2019 9:01 AM	CACHE File	44 KB
hcommon.pref	12/8/2019 3:05 PM	PREF File	1 KB
hcomposite.pref	12/8/2019 3:05 PM	PREF File	2 KB
hotkeys.pref	12/9/2019 10:00 AM	PREF File	1 KB
houdini.env	12/4/2019 11:10 AM	ENV File	1 KB
houdini.pref	12/8/2019 3:05 PM	PREF File	5 KB
networkeditor.pref	12/8/2019 3:05 PM	PREF File	5 KB
opencl.pref	12/8/2019 3:05 PM	PREF File	1 KB
palette	11/25/2019 2:17 PM	File	1 KB
scriptedpalette	11/25/2019 2:17 PM	File	2 KB
tool.pref	12/8/2019 3:05 PM	PREF File	0 KB
ui.pref	12/8/2019 3:05 PM	PREF File	1 KB

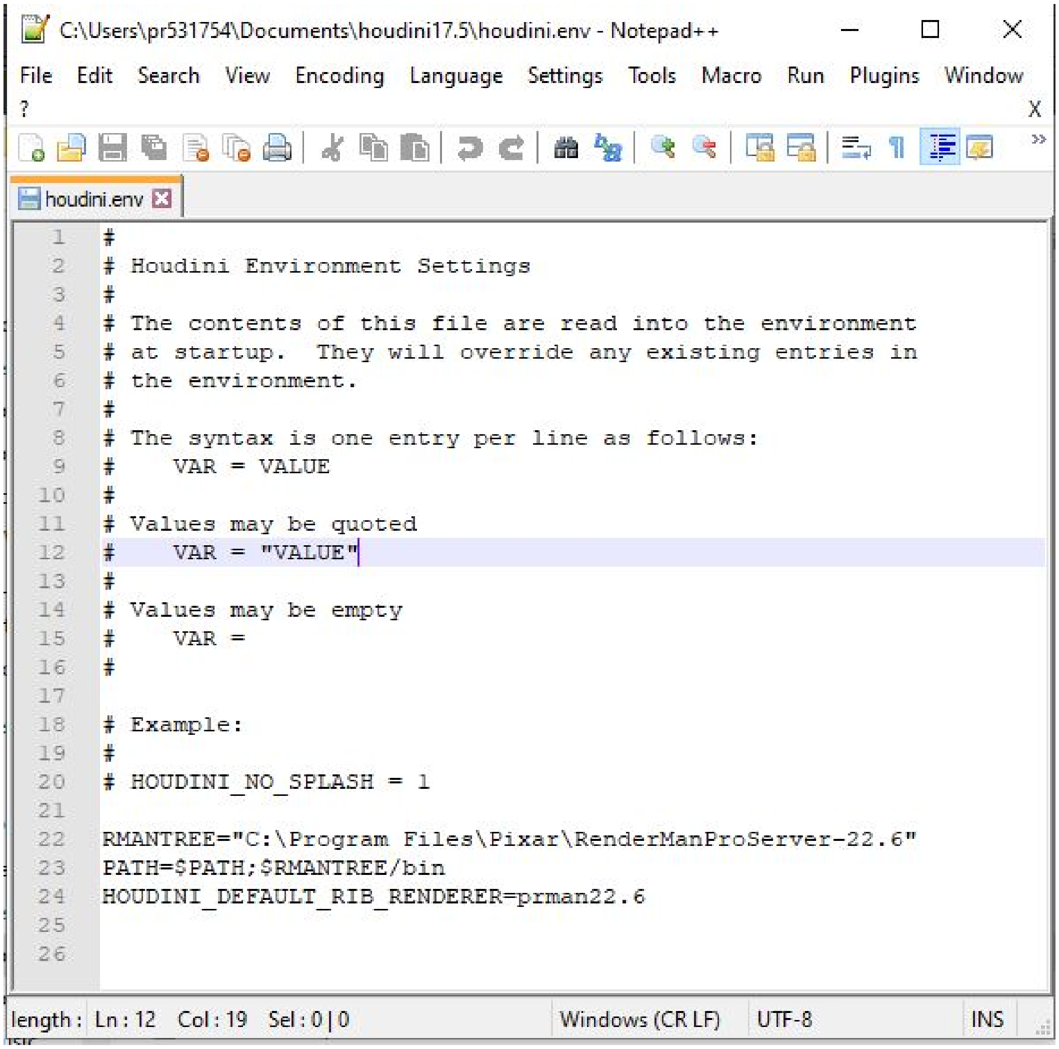
3. Find “houdini.env,” right-click on it, and open it with a text editor (such as notepad++).

4. At the end of all the text, copy and paste the following into the file:

```
RMANTREE="C:\Program Files\Pixar\RenderManProServer-22.6"

PATH=$PATH;$RMANTREE/bin

HOUDINI_DEFAULT_RIB_RENDERER=prman22.6
```



```
#
# Houdini Environment Settings
#
# The contents of this file are read into the environment
# at startup.  They will override any existing entries in
# the environment.
#
# The syntax is one entry per line as follows:
#    VAR = VALUE
#
# Values may be quoted
#    VAR = "VALUE"
#
# Values may be empty
#    VAR =
#

# Example:
#
# HOUDINI_NO_SPLASH = 1

RMANTREE="C:\Program Files\Pixar\RenderManProServer-22.6"
PATH=$PATH;$RMANTREE/bin
HOUDINI_DEFAULT_RIB_RENDERER=prman22.6
```

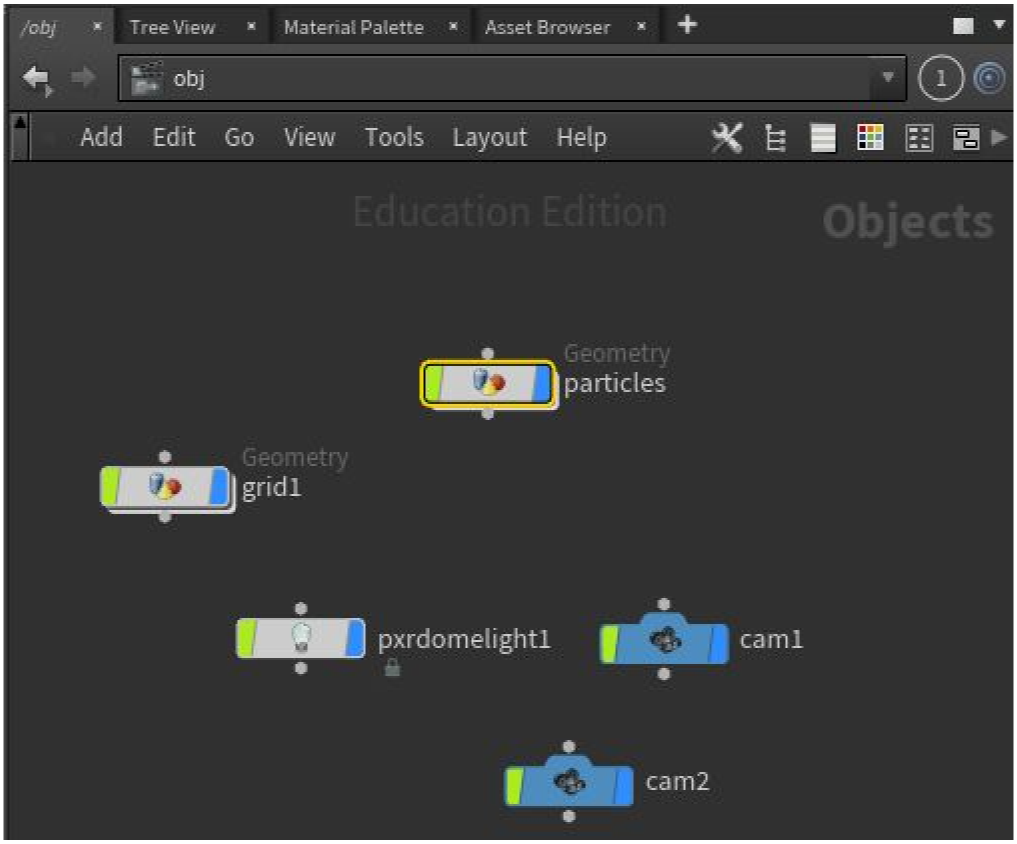
At the time of this paper, the version of the Renderman Pro Server installed on our computers was 22.6, follow the file path in the above text after RMANTREE to double-check if that’s correct for you. If it isn’t, simply change 22.6 to the correct version number.

5. Save your file. Renderman should now be working in Houdini.

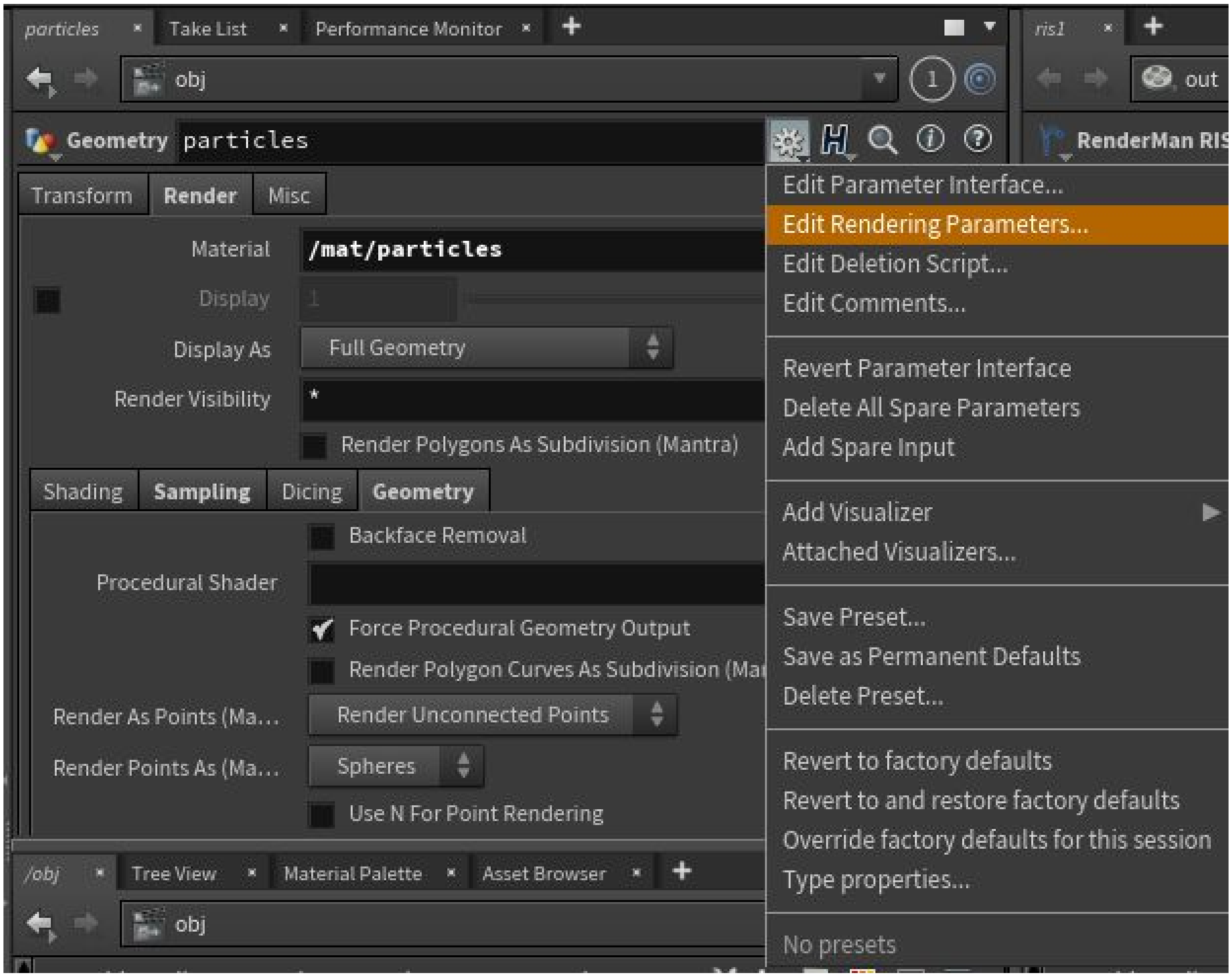
How to Render Particles

Particles will not render if you don’t do these steps first. Render parameters are not configured for Renderman in Houdini, you have to manually make visible the parameters that you want.

1. At Object Level in the Node Editor, select your particles geometry object.



2. In the Parameters window, click the gear icon and choose “Edit Rendering Parameters.”



Geometry particles

Material /mat/particles

☐ Display 1

Display As Full Geometry

Render Visibility *

☐ Render Polygons As Subdivision (Mantra)

☐ Backface Removal

Procedural Shader

☑ Force Procedural Geometry Output

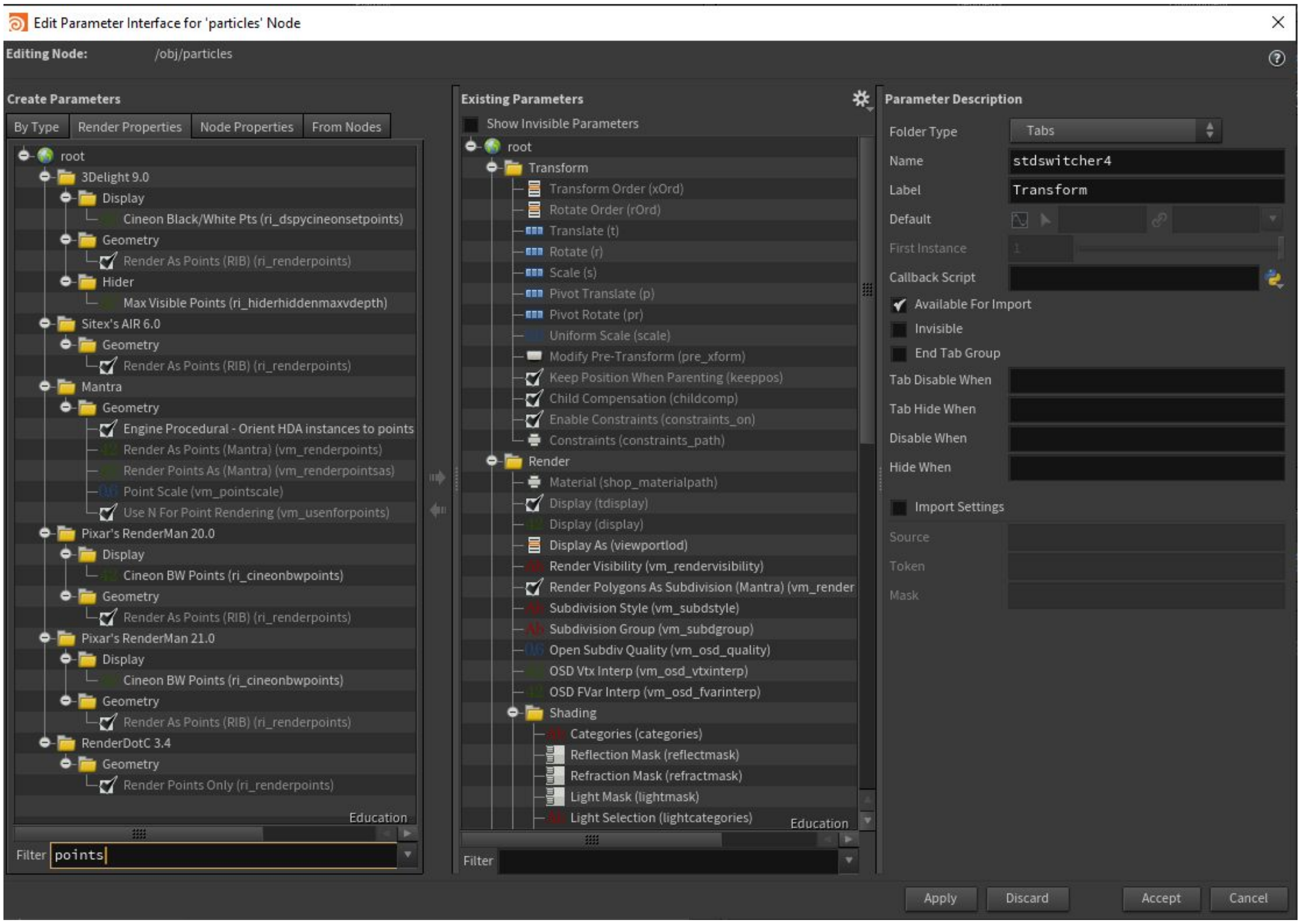
☐ Render Polygon Curves As Subdivision (Ma

Render As Points (Ma… Render Unconnected Points

Render Points As (Ma… Spheres

☐ Use N For Point Rendering

3. The Edit Parameter Interface will open. There are three panels, “Create Parameters,” “Existing Parameters,” and “Parameter Description.” In the “Create Parameters” panel, at the bottom, there is a “Filter” option. Type “points” into the filter and hit Enter.


Edit Parameter Interface for 'particles' Node
Create Parameters
By Type
Render Properties
Node Properties
From Nodes
root
3Delight 9.0
Display
Cineon Black/White Pts (ri_dspycineonsetpoints)
Geometry
Render As Points (RIB) (ri_renderpoints)
Hider
Max Visible Points (ri_hiderhiddenmaxvdepth)
Sitex's AIR 6.0
Geometry
Render As Points (RIB) (ri_renderpoints)
Mantra
Geometry
Engine Procedural - Orient HDA instances to points
Render As Points (Mantra) (vm_renderpoints)
Render Points As (Mantra) (vm_renderpointsas)
Point Scale (vm_pointscale)
Use N For Point Rendering (vm_usenforpoints)
Pixar's RenderMan 20.0
Display
Cineon BW Points (ri_cineonbwpoints)
Geometry
Render As Points (RIB) (ri_renderpoints)
Pixar's RenderMan 21.0
Display
Cineon BW Points (ri_cineonbwpoints)
Geometry
Render As Points (RIB) (ri_renderpoints)
RenderDotC 3.4
Geometry
Render Points Only (ri_renderpoints)
Education
Existing Parameters
Show Invisible Parameters
root
Transform
Transform Order (xOrd)
Rotate Order (rOrd)
Translate (t)
Rotate (r)
Scale (s)
Pivot Translate (p)
Pivot Rotate (pr)
Uniform Scale (scale)
Modify Pre-Transform (pre_xform)
Keep Position When Parenting (keeppos)
Child Compensation (childcomp)
Enable Constraints (constraints_on)
Constraints (constraints_path)
Render
Material (shop_materialpath)
Display (tdisplay)
Display (display)
Display As (viewportlod)
Render Visibility (vm_rendervisibility)
Render Polygons As Subdivision (Mantra) (vm_render
Subdivision Style (vm_subdstyle)
Subdivision Group (vm_subdgroup)
Open Subdiv Quality (vm_osd_quality)
OSD Vtx Interp (vm_osd_vtxinterp)
OSD FVar Interp (vm_osd_fvarinterp)
Shading
Categories (categories)
Reflection Mask (reflectmask)
Refraction Mask (refractmask)
Light Mask (lightmask)
Light Selection (lightcategories)
Education
Filter
Parameter Description
Default
First Instance
Callback Script
Available For Import
Invisible
End Tab Group
Tab Disable When
Tab Hide When
Disable When
Hide When
Import Settings
Source
Token
Mask
Apply
Discard
Accept
Cancel

Editing Node: /obj/particles

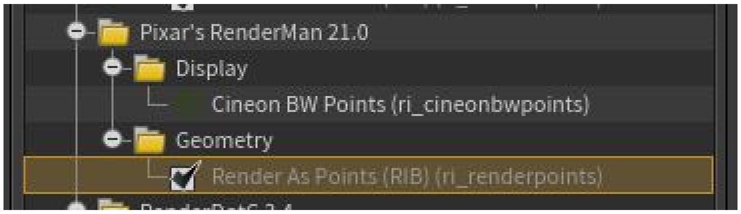
Filter: points

Folder Type: Tabs

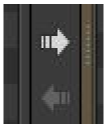
Name: stdswitcher4

Label: Transform

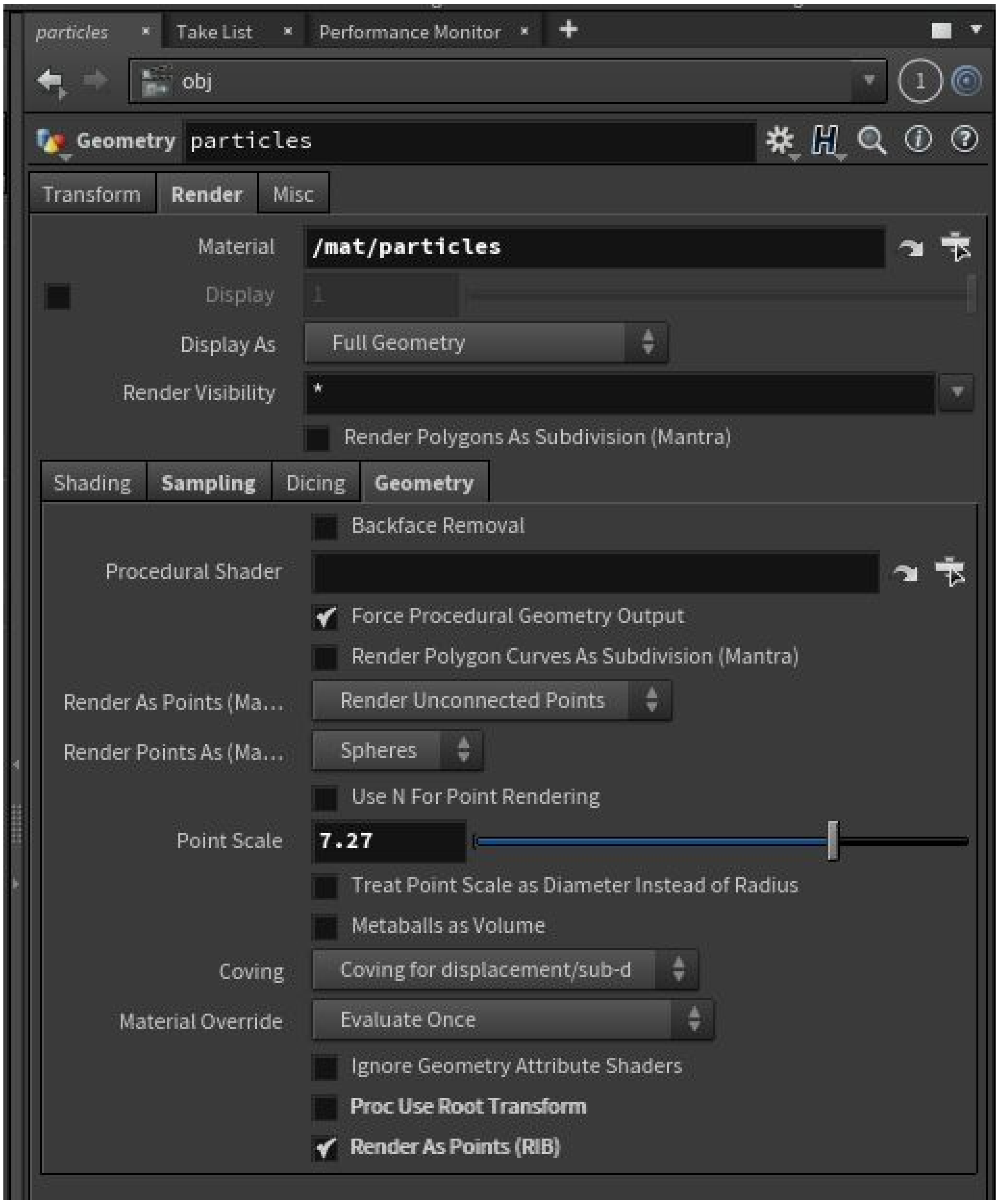
4. In the “Create Parameters” panel, Navigate to Pixar’s Renderman 21.0 (or whichever version you have) > Geometry > Render as Points. Select Render as Points.


Pixar's RenderMan 21.0
Display
Cineon BW Points (ri_cineonbwpoints)
Geometry
Render As Points (RIB) (ri_renderpoints)

5. Between the “Create Parameters” panel and the “Existing Parameters” window, there are two arrow icons. With Render as Points selected, click the arrow facing right.



6. This creates a "Render as Points" parameter on your particles geometry object. Click Apply and Accept on the Edit Parameters Interface.
7. With your particles geometry object still selected, in the Parameters window, navigate to the Render tab. Within the Render tab, navigate to the Geometry subtab.
8. Scroll down and check the box next to "Render as Points (RIB)."



Geometry particles

Material /mat/particles

□ Display 1

Display As Full Geometry

Render Visibility *

□ Render Polygons As Subdivision (Mantra)

□ Backface Removal

Procedural Shader

☑ Force Procedural Geometry Output

□ Render Polygon Curves As Subdivision (Mantra)

Render As Points (Ma... Render Unconnected Points

Render Points As (Ma... Spheres

□ Use N For Point Rendering

Point Scale 7.27

□ Treat Point Scale as Diameter Instead of Radius

□ Metaballs as Volume

Coving Coving for displacement/sub-d

Material Override Evaluate Once

□ Ignore Geometry Attribute Shaders

□ Proc Use Root Transform

☑ Render As Points (RIB)

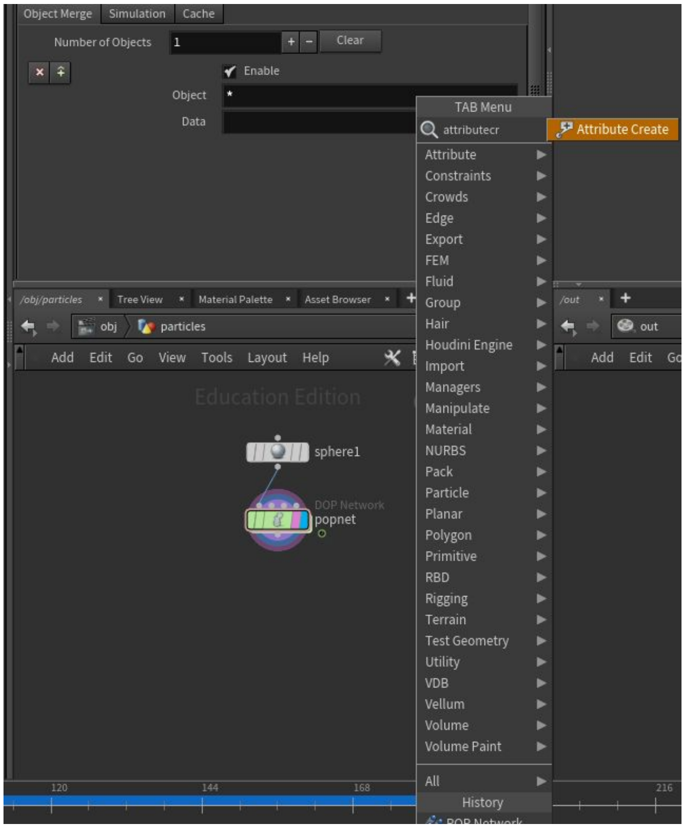
9. Now your particles should show up in your render. Don't forget to add a Dome Light to your scene and to assign a material to your geometry.

How to Change Particle Size

In Houdini, particle scale is controlled by an attribute called pscale. This attribute does not exist until you create it, however. You can create this attribute either using an Attribute Create node, or a Point VOP; what you choose depends on how you want to control particle size.

To create pscale with Attribute Create:

1. At Geometry Level in the Node Editor, press TAB and start typing "Attribute Create."

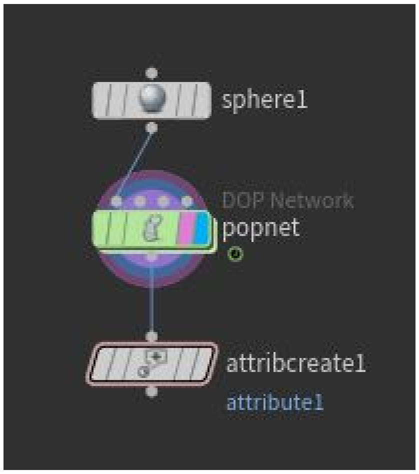


Number of Objects 1

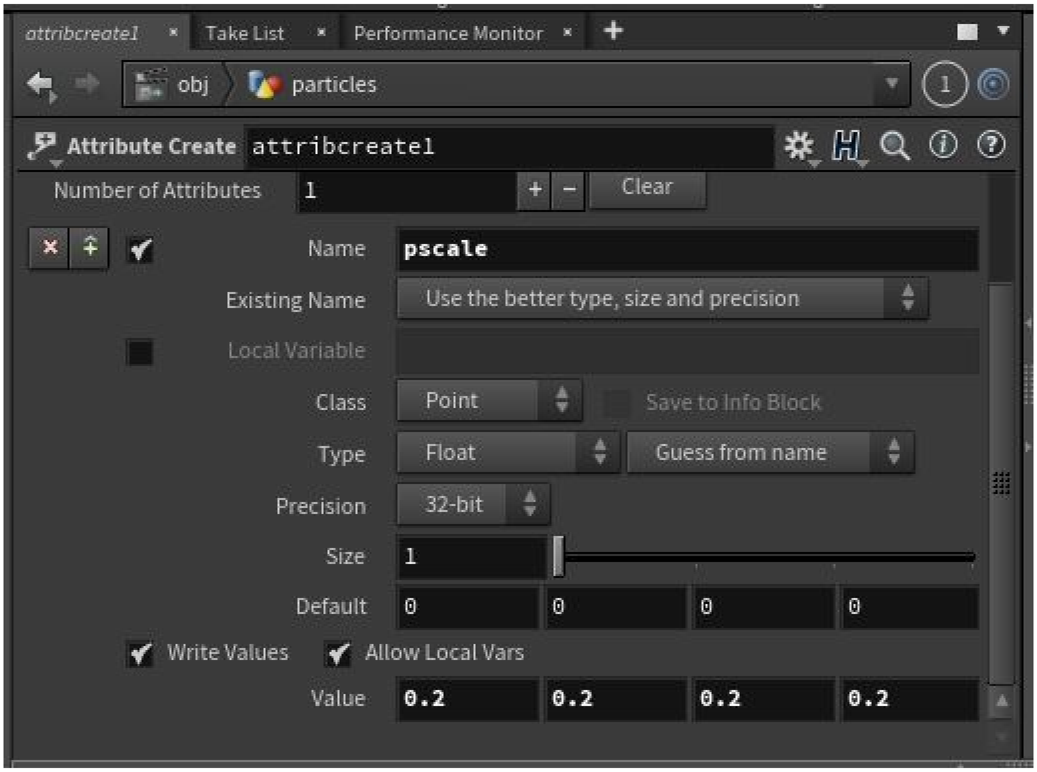
Object *

attributecr

2. Connect the Attribute Create node under your POPNet.



3. In the Parameter window with attribcreate1 selected, change the “name” to pscale, and the “Value” to whatever you want.



Attribute Create attribcreate1

Number of Attributes 1 + − Clear

Name pscale

Existing Name Use the better type, size and precision

Local Variable

Class Point   Save to Info Block

Type Float   Guess from name

Precision 32-bit

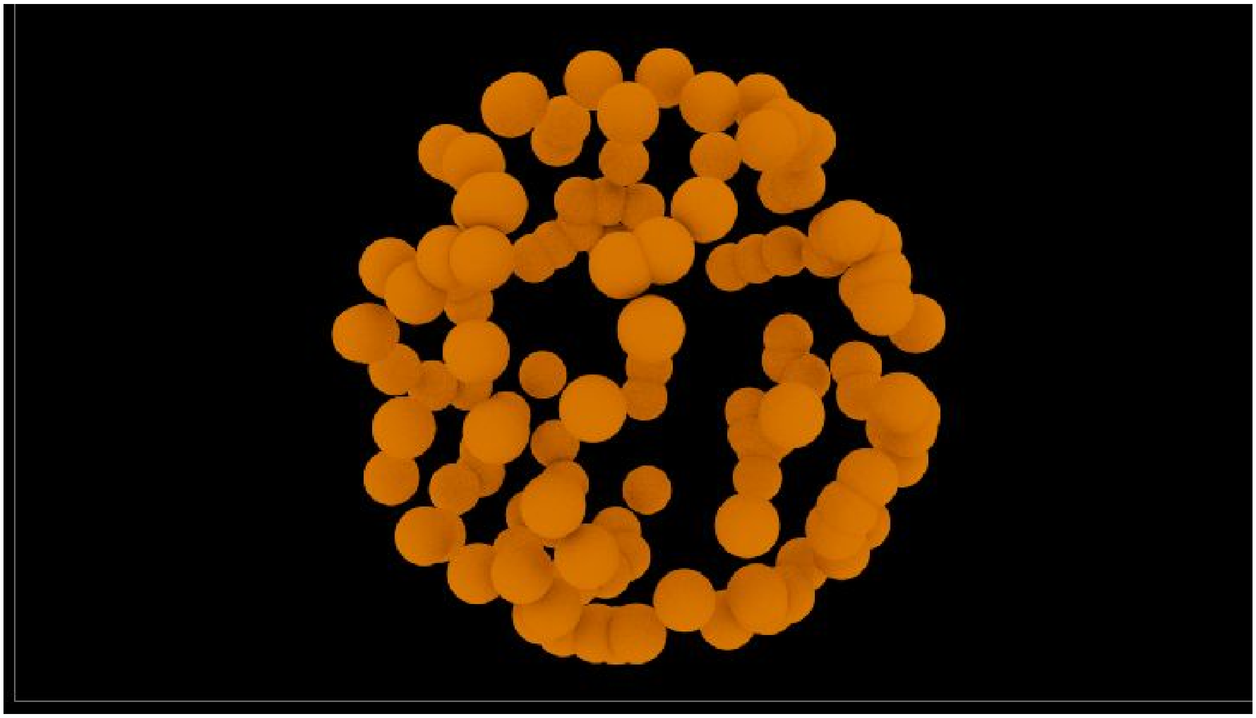
Size 1

Default 0 0 0 0

Write Values   Allow Local Vars

Value 0.2 0.2 0.2 0.2

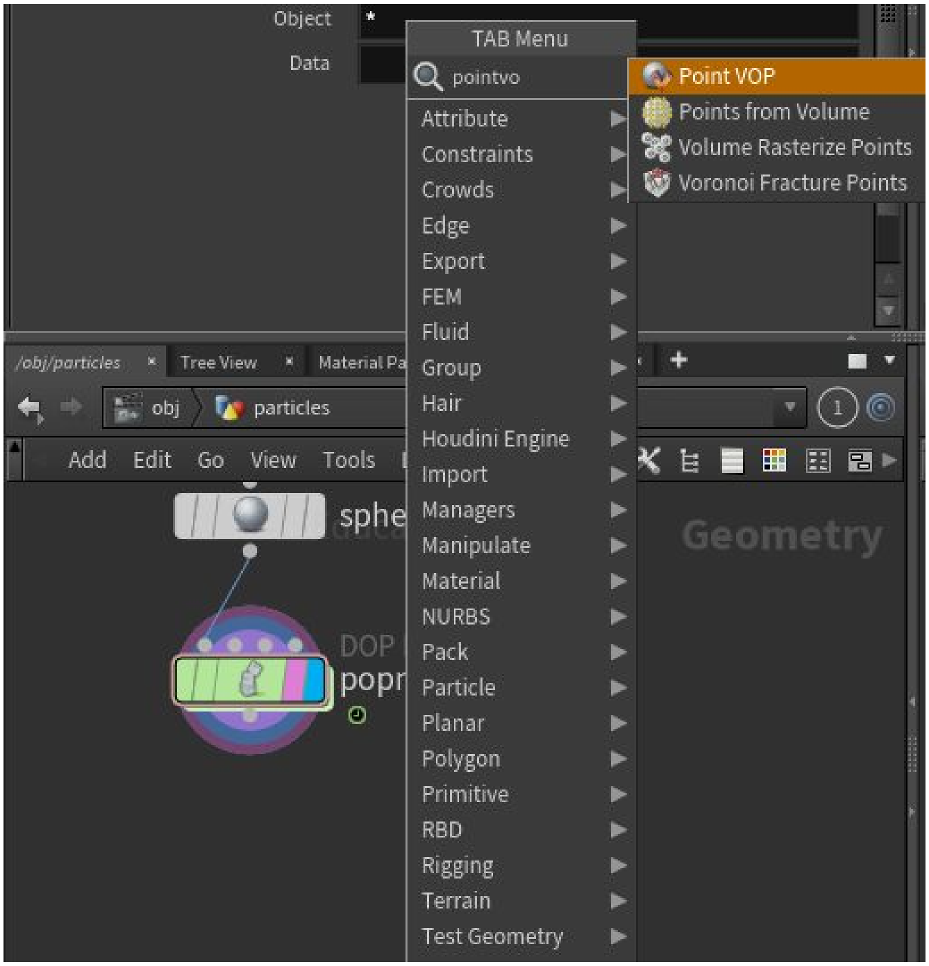
4. This is what my particles look like at 0.2 (Don’t forget to add a dome light and assign a pxrsurface).



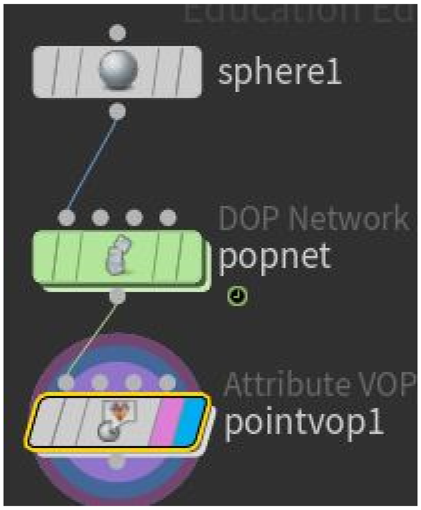
5. And that’s how you create pscale with Attribute Create! You can also add an Attribute Randomize node after Attribute Create to give some variation to pscale. In my opinion, this method isn’t as clean for adding noise or math to pscale, but works if your scene isn’t too complex.

To create pscale with a Point VOP:

1. With your cursor in the node editor at geometry level, press TAB and start typing “Point VOP.”

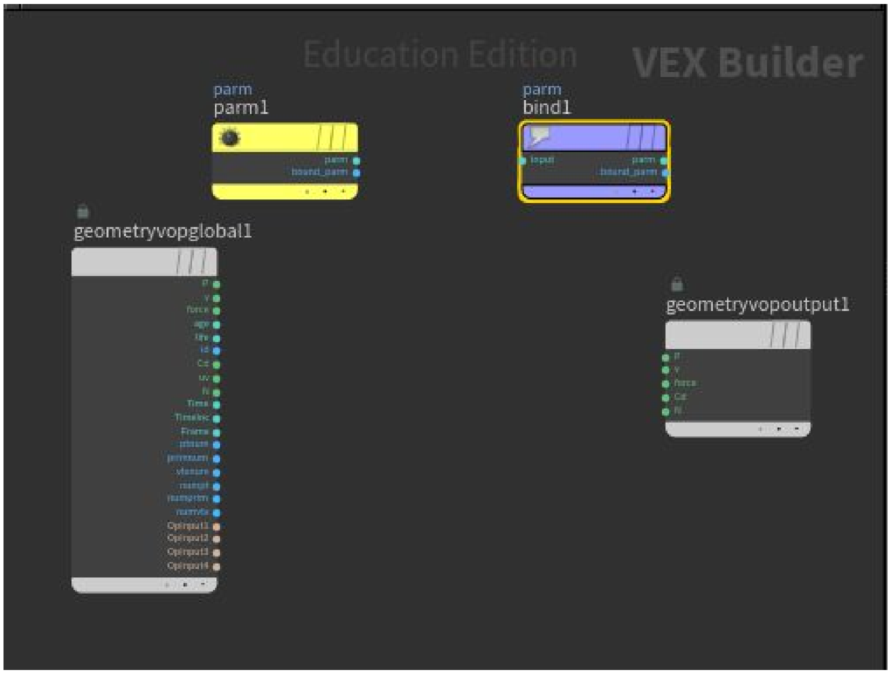


2. Press ENTER and connect the Point VOP node under POPNet.

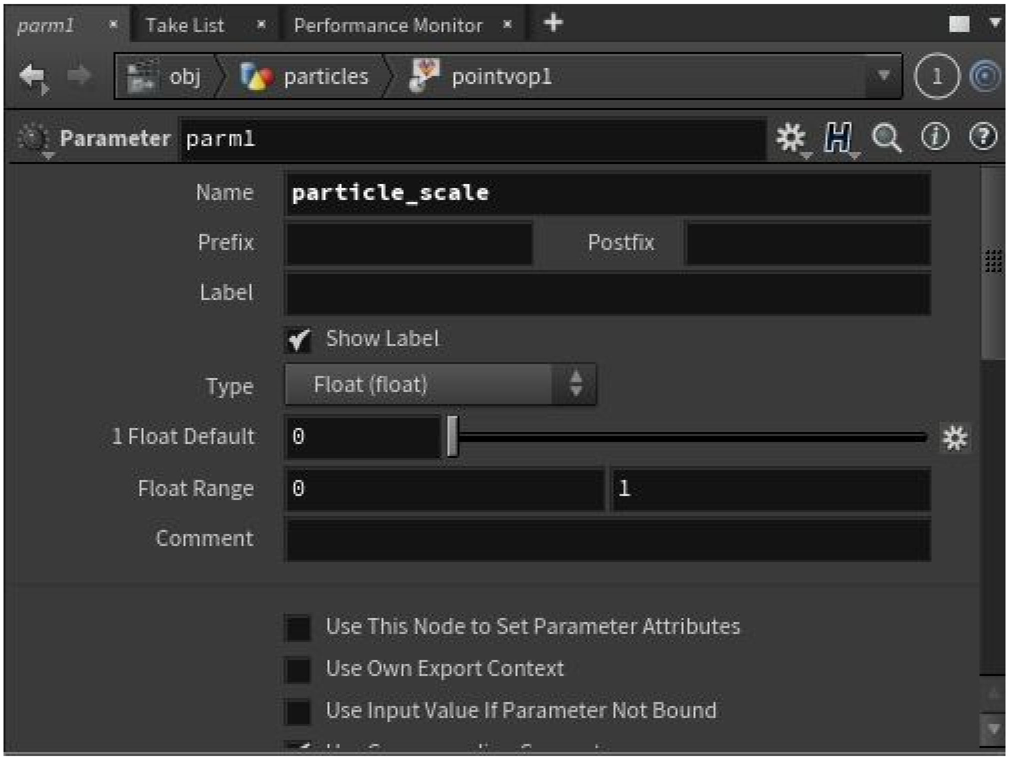


3. Double-click on the Point VOP node to enter it.

4. Create a Parameter node and a Bind Export node by pressing TAB and typing the names.



5. With “parm1” selected, in the Parameter window, set “Name” to particle_scale (or whatever you want to name this parameter).



Parameter parm1

Name particle_scale

Prefix

Postfix

Label

☑ Show Label

Type Float (float)

1 Float Default 0

Float Range 0 1

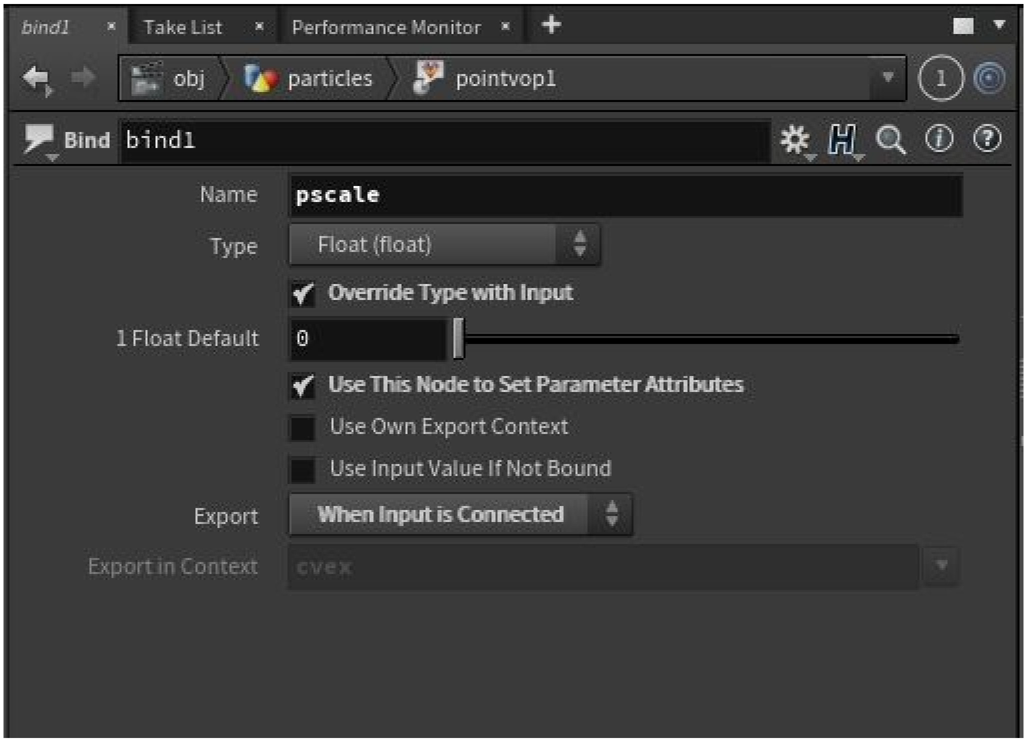
Comment

□ Use This Node to Set Parameter Attributes

□ Use Own Export Context

□ Use Input Value If Parameter Not Bound

6. With bind1 selected, in the Parameter Window, change “Name” to pscale.



Bind bind1

Name pscale

Type Float (float)

☑ Override Type with Input

1 Float Default 0

☑ Use This Node to Set Parameter Attributes

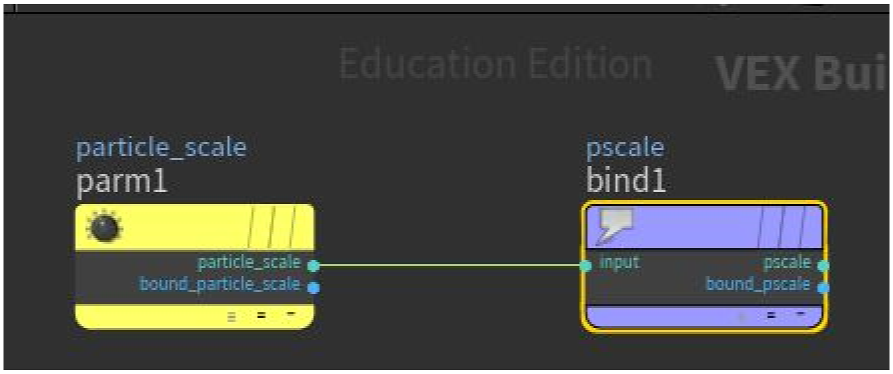
☐ Use Own Export Context

☐ Use Input Value If Not Bound

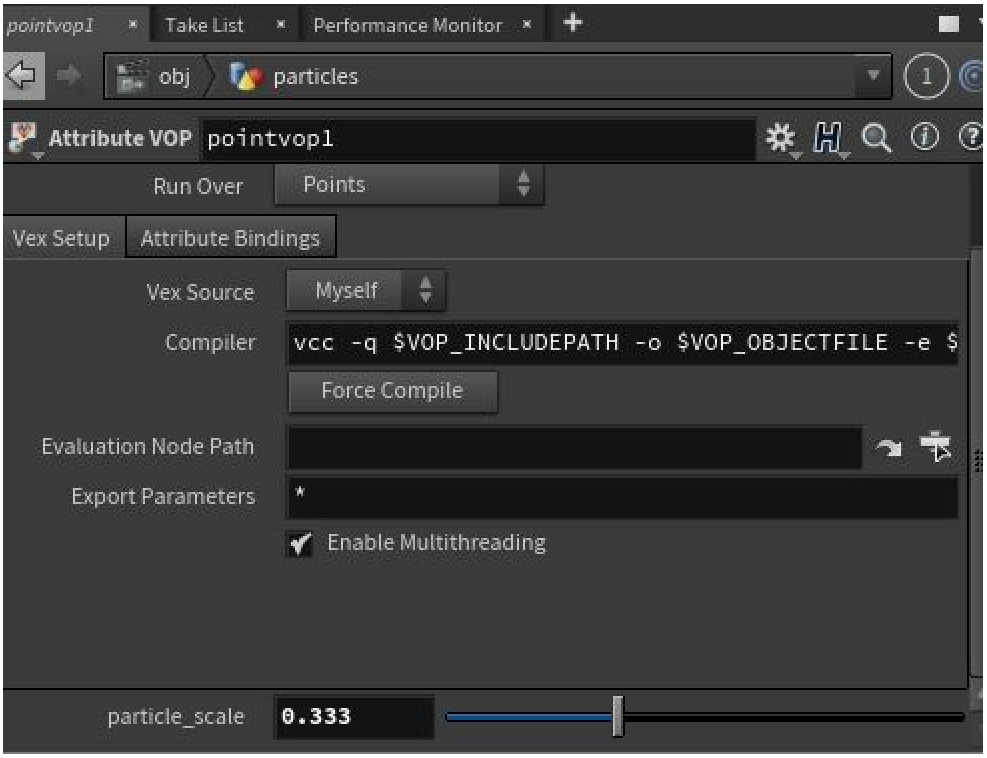
Export When Input is Connected

Export in Context cvex

7. Connect the particle_scale output on parm1 to the input of bind1 in the Node Editor.



8. In the Node Editor, hit the back arrow to go back to Geometry Level and select the Point VOP. If you look in the Parameter window, you will now see a slider for particle_scale. Change it to whatever you want.



Attribute VOP pointvop1

Run Over: Points

Vex Source: Myself

Compiler: `vcc -q $VOP_INCLUDEPATH -o $VOP_OBJECTFILE -e $`

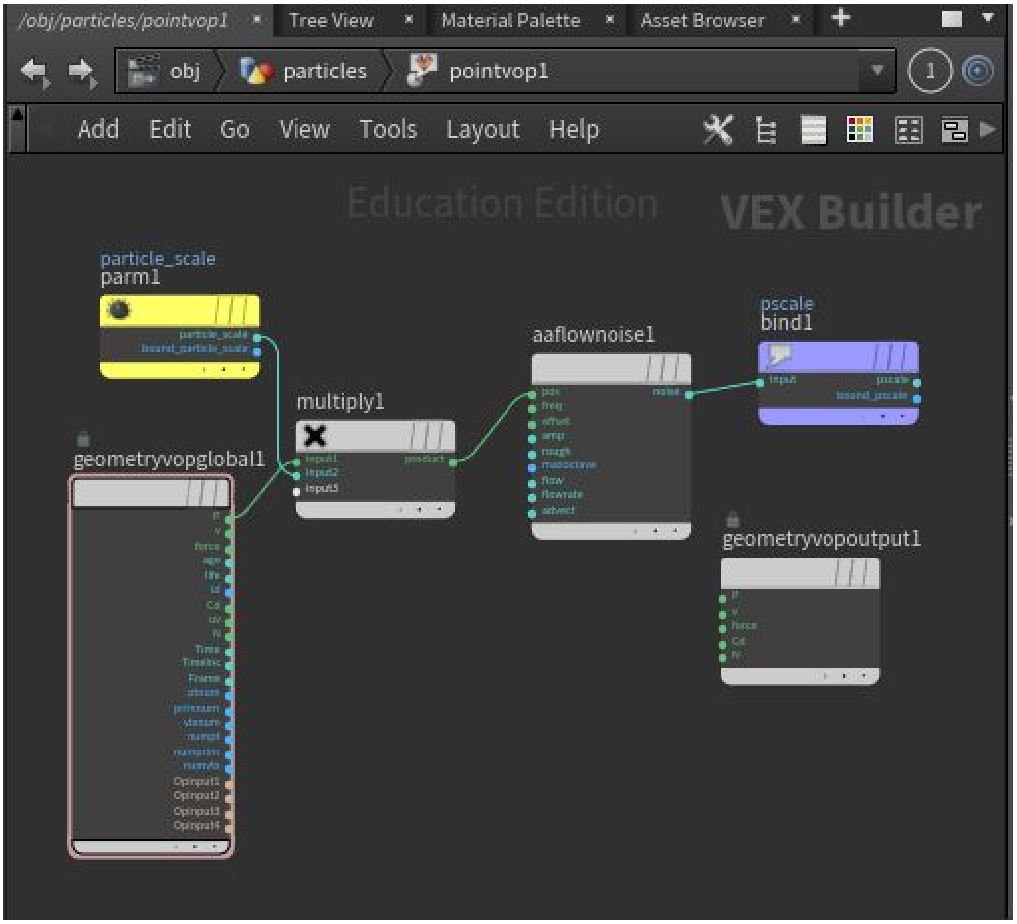
Evaluation Node Path:

Export Parameters: *

☑ Enable Multithreading

particle_scale: 0.333

9. And that’s how you create pscale with a Point VOP! I won’t get into all the ways to vary pscale within the Point VOP, but here’s an example that multiplies the value from particle_scale by the Position attribute of each particle, and then uses the result to add noise.



And what it looks like in the render, with particle_scale set to 0.287: